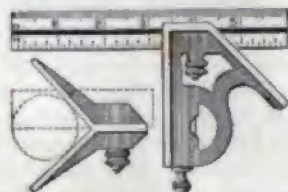


ESTABLISHED 1880.



Catalogue AND  
Price List  
OF  
FINE TOOLS  
FOR MECHANICS.



MANUFACTURED BY

L. S. STARRETT,  
ATHOL, MASS., U. S. A.

---

In towns where the Hardware Trade do not sell my Tools, I will  
send them, prepaid, upon receipt of list price.

# L. S. STARRETT, ATHOL, MASS.

## Please Notice.



**E**VERY tool listed in this catalogue is **warranted accurate and satisfactory.**

Some people stamp their names on my tools, causing them to spring, and then write me that they are defective. Stamping the name on them is the cause of their being "out." I cannot replace or exchange any tool on which a name has been stamped.

The prices in this catalogue are **net.**

Mechanics are requested to order my tools through hardware and tool dealers, but in towns where the hardware trade do not sell my goods, I will send them carriage prepaid, upon receipt of list prices.

When goods are ordered to be sent by express C. O. D., 20 per cent. of the amount must accompany the order, and the express charge for return of money will be added. Cash with order will save this extra expense.

In ordering do not fail to give the **size and number in catalogue** of each tool wanted.

I sell at a uniform discount, on 30 days time, to responsible hardware dealers.

Dealers without adequate commercial ratings must send satisfactory references.

I do not pay carriage in any case to dealers.

In ordering, say with each order how the goods are to be shipped, whether by freight, express or mail.

In the absence of shipping instructions we shall ship by what we consider the best way, cheapness, quickness and safety being considered.

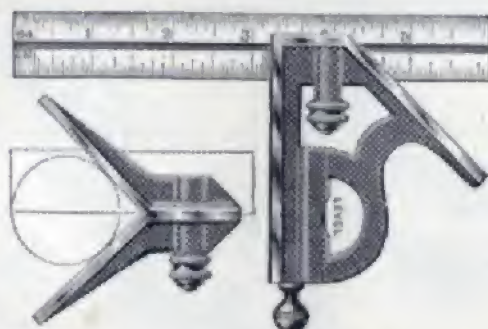
Goods ordered sent by mail are at the purchaser's risk. For Postal Insurance see third page of cover.

I assume no responsibility for goods shipped according to instructions, but should miscarriage or loss occur I will do my best, in the interest of the purchaser, to have the lost goods found, or proper restitution made by the express or railroad company at fault.

# FINE MECHANICAL TOOLS

## STARRETT'S PATENT COMBINATION SQUARE.

No. 11.



Every tool warranted accurate. With the adjustable scale, this forms one of the most convenient and useful tools ever devised for mechanics' use. One is a complete substitute for a whole set of common try squares, and is one of the best gauges ever made for transferring exact measurements or laying out work. It is also convenient for a depth gauge, or to square in a mortise. For a mitre it is perfect, while with the auxiliary center head it forms a centering square, both inside and outside, which for convenience and accuracy has no equal.

### PRICE LIST.

4 in., without center head or level,		\$1.00
6 " with center head,	\$2.00, without,	1.50
9 " " " "	2.50, " "	1.75
12 " " " "	3.00, " "	2.25
18 " " " "	3.75, " "	3.00
24 " " " "	4.25, " "	3.50

The 6, 9, 12, 18 and 24 inch have levels and center heads, and will be sent complete unless otherwise ordered. The 18 and 24 inch have same stock as 12 inch.

For the large 18 and 24 inch squares, formerly listed under No. 11, see No. 8, page 4. For price of separate parts see page 80.



# L. S. STARRETT, ATHOL, MASS.

## STARRETT'S SPECIAL STANDARD SQUARE.

No. 8.

This square is similar to No. 11, but is larger and heavier. It is designed for the use of manufacturers who desire to keep a reliable standard. No center head is made for this tool.

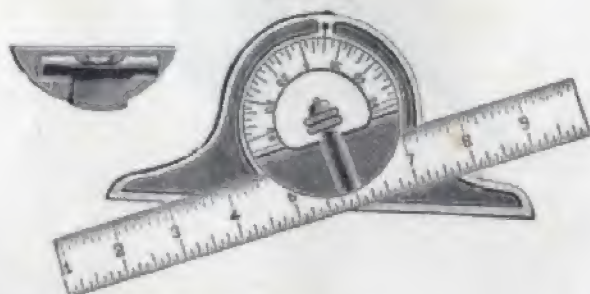
### PRICE LIST.

18 in., blade 1 9-16 in. wide by 1-10 in. thick, $\frac{3}{4}$ in. stock,	\$6.00
24 " " " " " " " " " " " "	7.00

For price of separate parts see page 80.

## IMPROVED BEVEL PROTRACTOR.

No. 12.



This is the best level protractor for the price yet invented. An adjustable rule, held firmly at any point by a thumb nut, passes through a revolving turret which is nicely graduated in degrees from 0 to 90, both right and left, and can be accurately adjusted to show any angle.

A valuable auxiliary is now made in the shape of a small level to be attached in place of the rule removed, forming an adjustable level to show any degree, thus greatly increasing the usefulness of the instrument.

This level will now be sent with every Protractor without extra charge. It will fit my Protractors formerly made, and will be sold alone for 50 cents each.

### PRICE LIST.

Protractor Head only,	\$2.00
" " with 12 in. blade,	3.00
" " " 18 in. " "	3.75
" " " 24 in. " "	4.75

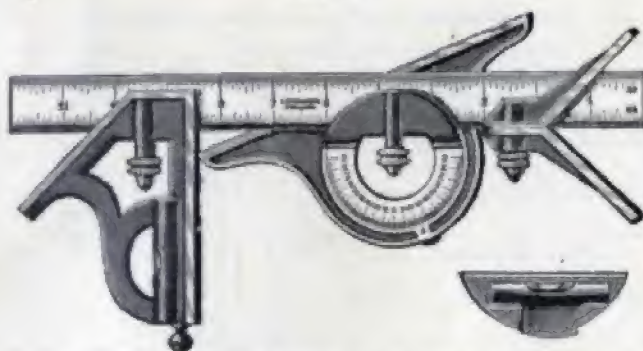
I also make and carry in stock a 5 in. Protractor head with 0 in. blade,  $\frac{1}{4}$  in. wide. Price, \$2.50.



## FINE MECHANICAL TOOLS

## STARRETT'S COMBINATION SET.

No. 9.



This cut shows Combination Square (No. 11, page 3) with center head and 7 in. Bevel Protractor head, (No. 12, page 4), all on the No. 11 Square scale. Each head may be instantly removed, or replaced and used interchangeably with the scale, thus forming the most useful combination set of tools ever devised for mechanics' use.

### PRICE LIST.

9 in., set complete,	\$4.50	18 in., set complete,	\$5.75
12 " " " "	5.00	24 " " " "	6.25

### DOUBLE STEEL SQUARE.

No. 14.



This cut represents a double *solid steel* square, with my patent  $\frac{3}{4}$  inch sliding scale, and is especially designed for fine tool-makers. The rule being narrow and instantly adjusted to any length, however short, allows it to be used where it would be impossible to use any square with a fixed blade.

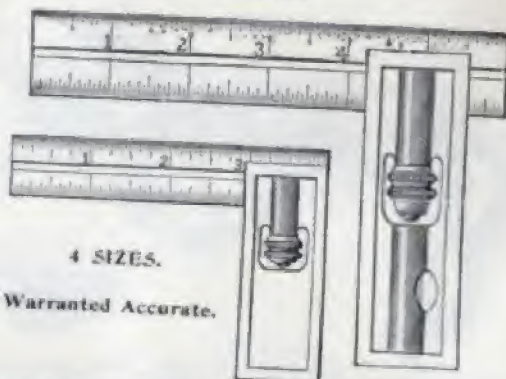
Fitted to go with this stock, I make not only a bevel blade, shown with my 4 in. double square (page 6), but a very narrow straight one, about  $\frac{1}{2}$  inch wide, highly prized by die makers for squaring small holes, both of which blades will be sent with the square unless otherwise ordered.

Price of Square,	\$2.00
" with either bevel or narrow blade,	2.30
" complete,	2.60

For price of separate parts see page 80.

# L. S. STARRETT, ATHOL, MASS.

## STARRETT'S PATENT DOUBLE SQUARE. No. 13.

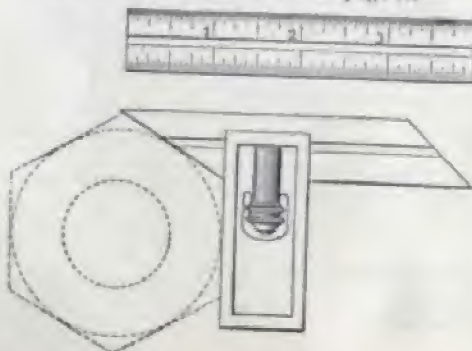


This square is conceded the most practical one for machinists' and fine tool-makers' use ever offered. The sliding scale, shortened or extended full length, makes it more valuable than a full set of the common kind, while with the extra level blade, shown in the following cut, we have both the hexagon and octagon angles.

The seat against which the blade is clamped being convex, should corners of the blade get injured, the accuracy of the square is not affected.

PRICE, 4 inch,	\$1.25, with both blades, \$1.65
" 6 "	2.00, " " " 2.50
" 9 "	3.00
" 12 "	4.00

Both blades with 4 and 6 inch always sent unless otherwise ordered.  
For price of separate parts see page 80.



This cut represents the 4 inch and 6 inch double square, with hexagon end of blade applied. Reverse it and the octagon is in position for use. Bevel blades are made to fit only 4 inch and 6 inch sizes.

# FINE MECHANICAL TOOLS.

## DRAUGHTSMAN'S T SQUARE.

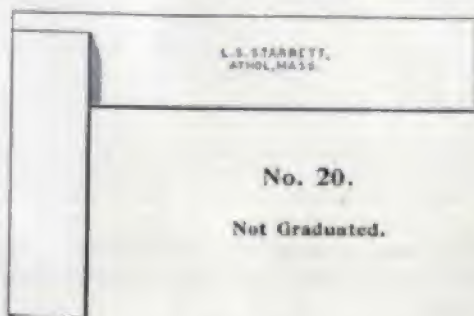


The head is made of cast iron and the blade of spring tempered steel, all nicely finished and warranted accurate.

### DIMENSIONS AND PRICE.

No. 16.	Head 8 in. long, blade 20 x 1 in., 3-64ths thick,	.	.	\$3.00
No. 18.	" 8 " " " 24 x 1 " " "	.	.	3.50
No. 19.	" 10 " " " 30 x 1 1/4 in. " "	.	.	5.00
No. 48.	" 10 " " " 48 x 1 1/4 " " "	.	.	6.50

## STARRETT'S HARDENED EDGE SOLID STEEL SQUARE.



No. 20.

Not Graduated.

### PRICES.

1 in. blade, inside beam,	.	.	\$1.50	4 1/2 in. blade, inside beam,	.	.	\$3.50
2 " " " "	.	.	2.00	6 " " " "	.	.	4.50
3 " " " "	.	.	2.50				



THIN STEEL TRY SQUARES,  
For Machinists and Draughtsmen.



### PRICE LIST.

2	Inch,	1-20	Inch thick,							\$1.00
3	"	1-20	"	"	"	"	"	"	"	1.50
4	"	1-16	"	"	"	"	"	"	"	2.00
6	"	1-16	"	"	"	"	"	"	"	3.00

The 2 inch and 3 inch are divided into 16ths and 64ths on one side, and into 32nds and 64ths on the other. The 4 inch and 6 inch are divided on both sides into 16ths and 32nds.

## FINE MECHANICAL TOOLS

## STARRETT'S PATENT INCLINOMETER.

No. 10.



The above cut represents an inclinometer, try square, and bevel protractor combined.

It is compact, convenient, and a complete and perfect substitute for several costly tools.

It consists of a CAST STEEL stock and disc, both slotted to receive the blade, which folds in the stock. The blade attached to the graduated rotary disc may be secured at any angle from 0 to 90 degrees, and by loosening the clamp screw it may be shortened or extended full length, or removed for a straight edge.

The working face of the stock, extending both sides of the blade, admits of its being reversed, so that the same angle may be laid off in opposite directions *without changing* the angle in the tool, thus requiring but  $\frac{1}{2}$  of a graduated circle to obtain all angles both ways.

At 90 degrees, the blade brings up against a case-hardened screw, accurately adjusted, thus forming a **TRY SQUARE**; by holding the blade perpendicular (the level in the stock being at right angles), a **PLUMB**; by folding the tool, a **LEVEL**, length of blade.

Open it to any degree, and work may be leveled to that incline.

14 A center head (see page 3), sent with Inclinator, when ordered, at an extra cost of 75 cents.

### PRICE LIST.

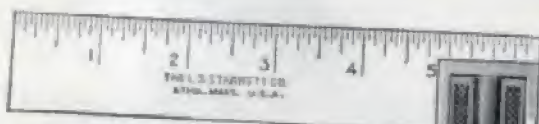
PRICE LIST.									
With 12 in. blade,									
No.	18	No.	22	"	"	"	"	"	\$5.00
"	"	"	"	"	"	"	"	"	6.00
"	24	No.	32	"	"	"	"	"	7.00

For price of separate parts see page 80.



## STARRETT'S RELIABLE TRY SQUARES.

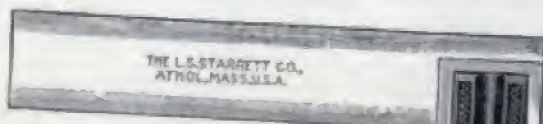
The following cuts represent a new line of Try Squares, handsome in design, light and convenient. The blade is not riveted or soldered to the stock, but is firmly held by our patent bolt and nut, by means of which the tool can be readily taken apart, and when worn the blade and stock can be reground or lapped, and put together again as good as new. Three styles are made as described below, Nos. 60, 61 and 62.



**No. 60.**

**Graduated Blade, Not Hardened.**

Length of Blade.	Length of Beam.	Price.
4 in.	$2\frac{1}{8}$ in.	\$1.00
5 "	3 "	1.15
6 "	$3\frac{1}{4}$ "	1.25
9 "	$5\frac{1}{8}$ "	2.00
12 "	6 "	2.75



**No. 61.**

**Blade with Hardened Edge, Not Graduated.**

Length of Blade.	Length of Beam.	Price.
4 in.	$2\frac{1}{8}$ in.	\$1.25
5 "	3 "	1.50
6 "	$3\frac{1}{4}$ "	1.75
9 "	$5\frac{1}{8}$ "	2.25
12 "	6 "	3.00

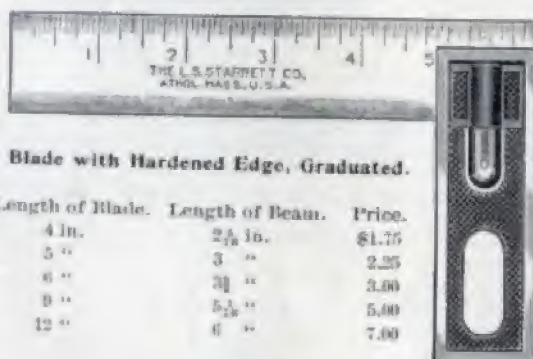




# FINE MECHANICAL TOOLS.

## STARRETT'S RELIABLE TRY SQUARES.

No. 62.

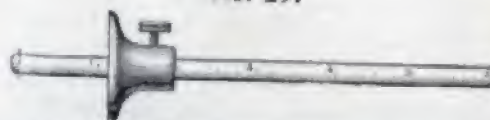


Blade with Hardened Edge, Graduated.

Length of Blade.	Length of Beam.	Price.
4 in.	2 <sup>1</sup> / <sub>2</sub> in.	\$1.75
5 "	3 "	2.25
6 "	3 <sup>1</sup> / <sub>2</sub> "	3.00
8 "	5 <sup>1</sup> / <sub>2</sub> "	5.00
12 "	6 "	7.00

## STARRETT'S SCRATCH GAUGE.

No. 29.



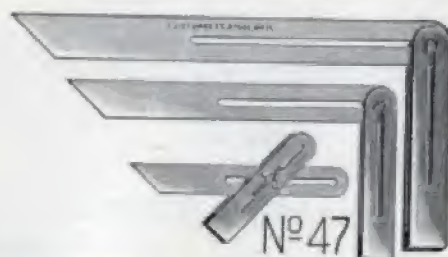
This Gauge is made of steel, with *hardened* cast steel head. Through it is a split lashing, against which the set screw acts to hold it firm. The beam is graduated in either 50ths or 64ths of an inch. The marker is a thin square piece of steel, nicely tempered, which is firmly held against the end of beam, presenting four marking points.

	GRADUATED.	NOT GRADUATED.
Price, 5 inch (beam 15-64 in.).	\$1.00	\$0.65
" 6 " ( " 5-64 " )	1.25	.75

Unless otherwise ordered, we shall send those graduated in 64ths.  
Two extra cutters will be sent with each gauge, fastened to the case. They should last for years.

# L. S. STARRETT, ATHOL, MASS.

## IMPROVED BEVEL.



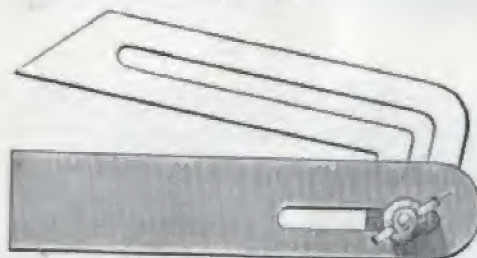
The advantages of this bevel, over any other tool of this kind made, consist in its having not only the blade slotted, but the stock as well, through and through, thus admitting adjustments that cannot be obtained with a common bevel. The clamping screw head, which the cut does not show, is let into a rabbet flush with the surface of the stock, which will lie flat on the work.

### PRICE LIST.

6 inch,	\$1.25	9 inch,	\$1.60
12 inch,	\$1.75		

## UNIVERSAL BEVEL.

No. 15.



Improved features. The set-off in the blade increases its capacity and usefulness for bevel gear work, etc., so that any angle, however slight, may be obtained.

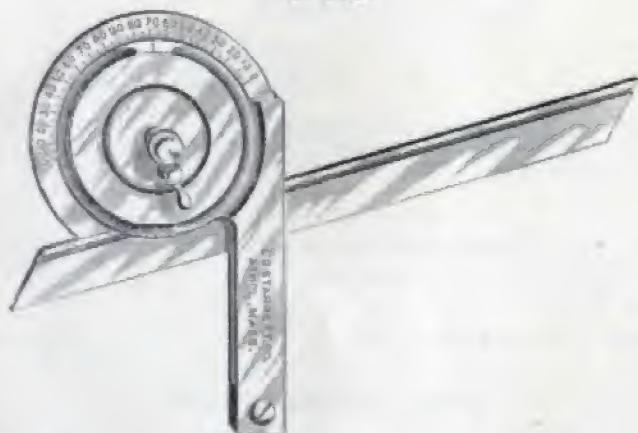
Another valuable feature is, one edge of the case being solid, forms a rest directly under the blade, where thin templets may be placed and accurately fitted.

PRICE,	\$1.50
--------	--------

# FINE MECHANICAL TOOLS

**STARRETT'S**

No. 360.



This tool weighs six ounces. The blade is 7 in. by  $\frac{1}{4}$  in., the stock 4 in. long, and both are made from sheet steel, nicely finished. The disc is graduated in degrees from 0 to 90 each way, and rotates the entire circle on a central stud inside the case. The blade (clamped by an eccentric stud against the edge of the disc), may be slipped back and forth its full length, or turned at any angle around the circle and firmly clamped at any point, adapting it for work in positions where others cannot be used, and rendering the common universal bevel (for transferring angles), unnecessary. One side of the stock being flat, makes it a convenient tool for laying on paper in drafting, etc., and it has double the utility of any other tool of the kind. A 12 in. blade is made to fit this tool, and will be sent to order.

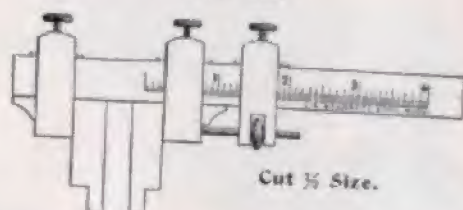
Paper, with 7 in. blade,						\$5.00
" " 12 " "						6.00
" 7 in., with Morocco Case,						8.75
" 12 " "						7.00



# L. S. STARRETT, ATHOL, MASS.

## CALIPER SQUARE.

No. 25.



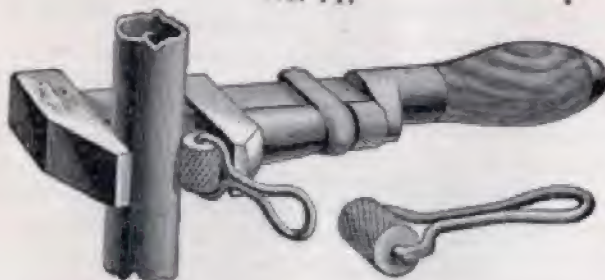
The above cut represents an improved tool for both outside and inside measure. The beam is nicely graduated, 64ths on one side, 100ths on the other. For close work this is a reliable tool.

### PRICE LIST.

3 in., with adjusting screw,	\$3.50	6 in.,	\$5.50
3 " without " "	3.00	6 " "	5.00
4 " with " "	4.00		
4 " without " "	3.25		
With hardened jaws, extra,			1.50

## PIPE ATTACHMENT.

No. 71.



The cheapest pipe attachment for monkey wrenches made. The cylinder, of hardened steel, rolls in between the jaw of the wrench and any round iron or pipe, causing the wrench to grip it firmly.

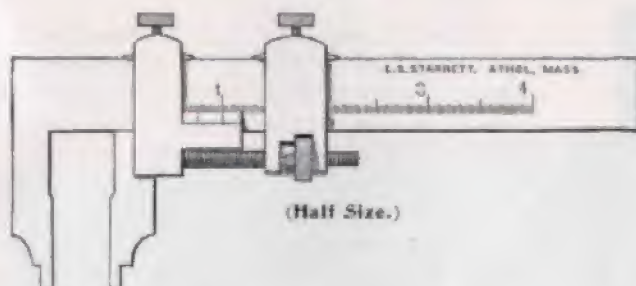
Price,  $\frac{1}{2}$  inch,

.25

# FINE MECHANICAL TOOLS

## STARRETT'S MICROMETER CALIPER SQUARE.

No. 28.



### For Outside and Inside Measure.

This instrument is invaluable, as it enables one to enlarge or decrease work one or more thousandths from that calipered, and fills the bill for both a first-class caliper square and micrometer of large scope and quick adjustment. The jaws are  $1\frac{1}{2}$  inches long, hardened, and open four inches. One side of the beam is graduated in 64ths, and the other 40ths; and either side may be used as a common caliper square, or, through the micrometer, to show 1000ths full length, on either inside or outside work. This is done by first setting the indicator mark on the movable jaw to agree with any division nearest the size wanted. Fasten it there, slack binding clasp, and turn the micrometer nut to agree with indicator mark on the clasp; now tighten this, slack movable jaw and turn micrometer nut, counting 1000ths, adding to or taking from the divisions shown on beam at the starting point.

An excellent feature of this instrument is the spiral spring between jaw and clasp, which not only takes up all back lash, but limits the pressure against the work to strength of spring. This is instantly felt through released pressure on the nut, and prevents springing the jaws, thus calipering to a nicety.

PRICE, in Morocco Case,	•	•	•	•	•	•	•	•	•	\$8.75
" without case,	•	•	•	•	•	•	•	•	•	8.00

Sent with case, unless otherwise ordered.

## STARRETT'S "SPEEDED SCREW" MICROMETER.

### No. 3. (Cut Full Size.)

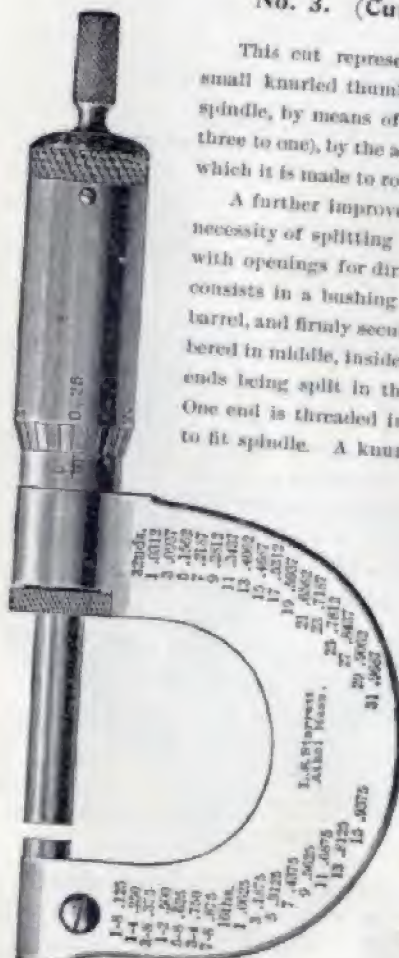
This cut represents an improved Micrometer with a small knurled thumb piece on the operating end of the spindle, by means of which its rotation is speeded (about three to one), by the action of the thumb and finger between which it is made to rotate.

A further improvement in this Micrometer (saving the necessity of splitting the barrel to take up wear in the nut, with openings for dirt to get through, as in other makes), consists in a bushing running through full length of the barrel, and firmly secured therein, said bushing being chambered in middle, inside, and each end tapered outside, both ends being split in three sections nearly half the length. One end is threaded inside for the screw, the other smooth to fit spindle. A knurled nut, threaded on the outside, is

screwed to each end of the barrel, telescoping the ends of bushing, one to take up wear and cause a close fit between the screw and nut, the other to contract the bushing to a close fit on the spindle, or by a slight turn of the nut lock firm, thus making a solid gauge when desired, which for reliability has no equal.

PRICE, . . . . \$6.00  
With Morocco Case, 6.50

Sent with case, unless otherwise ordered.





# FINE MECHANICAL TOOLS.

## STARRETT'S INSIDE MICROMETER.

No. 120.



This instrument is designed for micrometer measurements reading 1-1000 with  $\frac{1}{2}$  in. movement of the screw. V shaped grooves are cut in the measuring rods accurately spaced  $\frac{1}{4}$  in. apart, and the rods are held in the Micrometer head by a spring pin fitting the grooves, giving a standard starting point for every  $\frac{1}{4}$  in. of its length, while the screw fills in the finer measurements. From 4 in. to  $11\frac{1}{4}$  in. requires three extension rods. For lengths above  $11\frac{1}{4}$  in. an extension sleeve is screwed onto the Micrometer head providing for a greater range to telescope longer rods and requiring less of them; four from  $11\frac{1}{4}$  in. to 30 in., two of which are made to couple together, thus taking less room.

A blinding screw locks the Micrometer, preventing accidental movements after the tool is set. All wearing parts are hardened and are also provided with an adjustment to compensate for wear.

### PRICES.

Micrometer with 3 rods covering lengths from 4 in. to $11\frac{1}{4}$ in., with case,	\$6.00
With extension sleeve and 3 rods covering lengths from 4 in. to 30 in.,	
with case,	10.00

## STARRETT'S ADJUSTABLE CALIPER GAUGE.

No. 125.



Designed for internal measurements of large cylinders and of distances between uprights. The body of the tool is a steel tube provided with a blinding chuck on each of its ends. Into one end is clamped a plain rod, that, when the chuck is loosened, can be quickly adjusted to any approximate size. Into the other end is screwed a threaded anvil for fine adjustment.

To set the gauge, loosen the chuck that clamps the wire rod, slide the rod out or in to the required size, and clamp it. If not quite correct, loosen the chuck on the opposite end and turn the anvil out or in what little is needed.

Made from steel throughout, and nicely finished.

### PRICES.

3 in. with two rods, capacity from 5 in. to 6 1/4 in.	\$1.00
6 " " three " " " 6 " " 10 "	1.25

The diameter of the steel rods is .150 in. Extra rods furnished at 1c. per inch.

# FINE MECHANICAL TOOLS

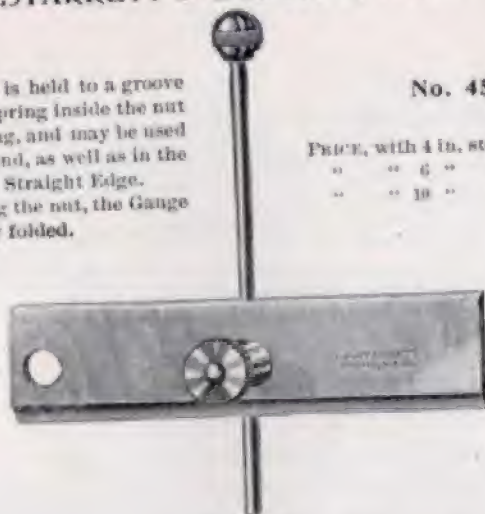
## STARRETT'S DEPTH GAUGE.

This Gauge is held to a groove by a friction spring inside the nut while adjusting, and may be used close to the end, as well as in the middle of the Straight Edge.

By loosening the nut, the Gauge may be neatly folded.

No. 45.

PRICE, with 4 in. stock,	\$0.75
" " 6 " "	1.15
" " 10 " "	1.35

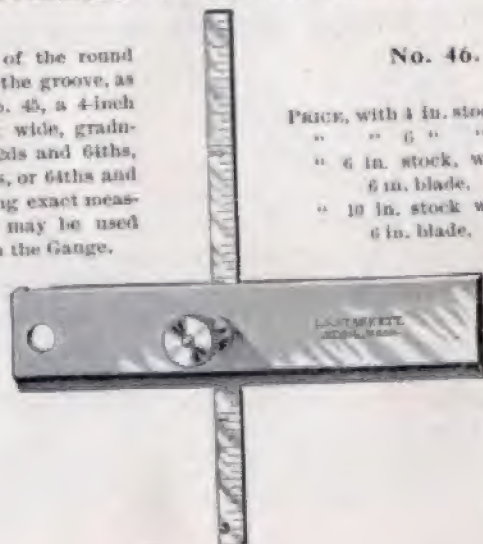


## STARRETT'S DEPTH GAUGE.

Has in place of the round wire to slide in the groove, as shown with No. 45, a 4-inch scale, 3-16 inch wide, graduated in either 32ds and 64ths, 50ths and 100ths, or 64ths and 100ths, indicating exact measurements, and may be used separately from the Gauge.

No. 46.

PRICE, with 4 in. stock,	\$1.25
" " 6 " "	1.50
" 6 in. stock, with 5 in. blade,	1.75
" 10 in. stock with 6 in. blade,	2.25





# L. S. STARRETT, ATHOL, MASS.

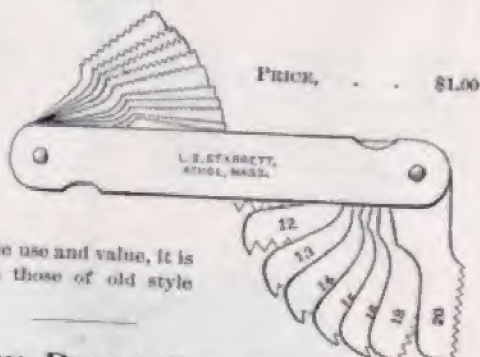
## IMPROVED SCREW PITCH GAUGE.

No. 40.

This Gauge has twenty pitches, viz.: 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

This is the *only* gauge made that can be used inside a nut as well as on the outside of a screw or bolt.

Notwithstanding its double use and value, it is sold for the same price as those of old style having less pitches.



## SCREW PITCH GAUGE.

No. 11½.

For pipe and brass work. This Gauge is the same as No. 40, except that pitches 8, 11½ and 27 are substituted in place of 36, 38 and 40.

PRICE, . . . . . \$1.00

## WHITWORTH SCREW PITCH GAUGE.

No. 7.

20 Pitches, 4 to 30.



Cut Full Size.

For Whitworth  
Standard Thread only.

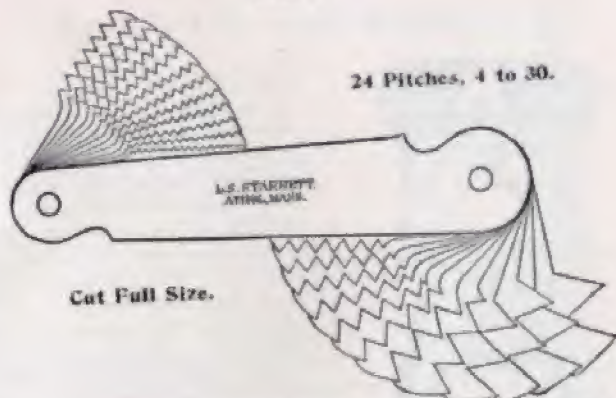
Has the following pitches: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22, 24, 26, 28, 30.

PRICE, . . . . . \$1.25

# FINE MECHANICAL TOOLS.

## SCREW PITCH GAUGE.

No. 4.



In response to many inquiries for a Screw Pitch Gauge with coarser pitches than those in my well-known No. 40 and No. 11 $\frac{1}{2}$  Gauges, I am now making one with the following pitches: 4, 4 $\frac{1}{2}$ , 5, 5 $\frac{1}{2}$ , 6, 7, 8, 9, 10, 11, 11 $\frac{1}{2}$ , 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30. The teeth are sharp and clean cut. Like my No. 40 and No. 11 $\frac{1}{2}$ , it can be used inside of a nut as well as on outside of a screw or bolt. It is also a convenient and reliable tool to use as a 60-degree center gauge and gauge to test the grinding of either an inside or outside threading tool.

PRICE, . . . . . \$1.25

## SCREW PITCH GAUGE.

No. 5.

26 Pitches, 32 to 82.

Of the same form as my No. 40 Screw Pitch Gauge, for inside and outside work. Has the following pitches: 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82.

PRICE, . . . . . \$1.25

## SCREW PITCH GAUGE.

No. 6.

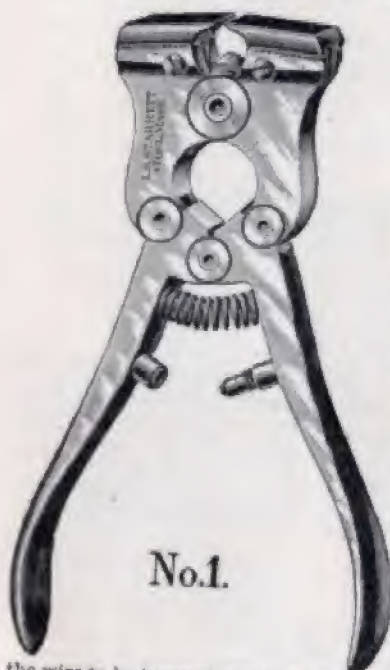
30 Pitches, 4 to 42.

Of the same form as my No. 4 Screw Pitch Gauge. Has the following pitches: 4, 4 $\frac{1}{2}$ , 5, 5 $\frac{1}{2}$ , 6, 7, 8, 9, 10, 11, 11 $\frac{1}{2}$ , 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42.

PRICE, . . . . . \$1.50

# L. S. STARRETT, ATHOL, MASS.

## STARRETT'S ADJUSTABLE JAW CUT-NIPPER.



No. 1.

This tool was designed to supply the demand for a better thing in its line than has hitherto been obtainable. A brief examination will convince any mechanic that it does so.

The jaws are detachable, so that they can be removed, ground and adjusted when they have become worn. Each jaw can be ground away to the extent of  $\frac{1}{4}$  inch, remaining as good as new for practical use; and when used up, if ever, new jaws can be procured.

These jaws have a dove-tailed slot in their under side to receive a spline, which extends into a slot in the frame. A tapering screw through the frame and spline draws the jaw firmly down to a toothed seat in the frame, holding it securely.

Another improved feature in this Cut-Nipper is a flat spring below the cutting edges and over the joint, forming a yielding seat for the end of the wire to press against while being cut. This obviates the danger of breaking the jaws,—as often happens with other styles of cut-nippers which allow

the wire to be inserted against a solid surface, thereby creating a pushing out strain on the jaws when they are pressed together.

The head and handles are of drop forged steel, finely finished. All the parts are case hardened, except the jaws. These are made from a high grade of steel, nicely tempered. Those warranted to cut music wire have their cutting edges ground to a short steep bevel, while those for common use have their cutting edges ground more acute, work easier, and are preferable for cutting softer wire, or for general use.

In ordering, please designate the style wanted, as below.

Price, $5\frac{1}{4}$ inch, M, (for Music wire),	\$2.00
" $5\frac{1}{4}$ " C, (for common use),	2.00
" 7 " either M or C,	2.50
Extra Jaws, either M or C, which should be designated, as above,	.50



# FINE MECHANICAL TOOLS

**D**URING the past twelve years, I have established a reputation for making the best and most reliable line of heavy, light, spring-tempered and flexible rules produced. Profiting by experience, I have recently constructed new graduating machines from my own designs, and have fitted up new departments equipped with every appliance needed for turning out accurate work in this branch of my business at bottom cost; so that by my improved processes, I am able not only to make all my rules from hard, unannealed and spring-tempered stock, but also to sell them as low as any common soft rule is sold.

Attention is called to the large variety of graduations listed. In addition to the U. S. standard graduations, I am making a line of rules in flexible, spring-tempered and heavy rules graduated in the metric system. See No. 23.

I do not consider that rules graduated across the end possess any material advantage, but make them at an extra cost and at the same prices charged by others, with No. 4 graduation only, in sizes from 2 inch to 12 inch inclusive, to be sent when specially ordered.

In ordering rules, be careful to give catalogue number, graduation number, length, and state whether light (*i. e.*, spring-tempered), or heavy rules are wanted.



## STEEL RULES.

### No. 30.



The heavy rules from 4 inches to 9 inches are about 5-64ths thick; 12 inches to 24 inches are 3-32nds thick; width in proportion. The light ones are spring-tempered, No. 18 gauge, from  $\frac{1}{2}$  inch to 1 inch wide, and from 1 inch to 36 inches long. The 12 in. and over are about 1 in. wide. These rules are divided into parts of inches as follows:

#### No. 1 GRADUATION.

1st corner,	10, 20, 50, 100
2d "	12, 24, 48
3d "	16, 32, 64
4th "	14; 28

#### No. 2 GRADUATION.

1st corner,	10, 20, 50, 100
2d "	12, 24, 48
3d "	16, 32, 64
4th "	8

#### No. 4 GRADUATION.

1st corner,	64
2d "	32
3d "	16
4th "	8

#### No. 7 GRADUATION.

1st corner,	64
2d "	32
3d "	16
4th "	100

## PRICE LIST.

### No. 4 AND No. 7 GRAD. No. 1 AND No. 2 GRAD.

1 inch,	\$ .20	\$ .20
2 "	.25	.30
3 "	.35	.40
4 "	.45	.50
6 "	.65	.75
9 "	1.00	1.12
12 "	1.25	1.50
18 "	2.00	2.25
24 "	2.50	3.00
36 "	4.00	5.00
48 "	7.00	8.50

Unless otherwise ordered, light rules (spring tempered), of No. 4 graduation will be sent, No. 4 being the graduation most in use.

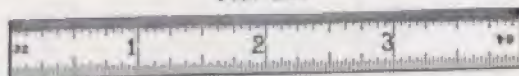
The END GRADUATION is on rules of No. 4 graduation only, sizes 2 in. to 12 in., and when so graduated the price will be the same as for Nos. 1 and 2 graduations.

No HEAVY RULES are made smaller than 4 in.

# FINE MECHANICAL TOOLS.

## FLEXIBLE RULES.

### No. 31.



This cut represents a very thin watch-spring tempered rule, nicely graduated on one side only, in either 32ds and 64ths, 64ths and 100ths, or 50ths and 100ths whole length. Those from 1 inch to 12 inches are  $\frac{1}{8}$  inch wide, and will easily conform to a 2 inch circle. Those from 18 inches to 24 inches are  $\frac{1}{4}$  inch wide, and are made from a trifle heavier stock.

These rules are highly prized by watchmakers and all fine mechanics for measuring irregular surfaces.

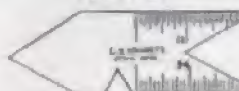
32-64 graduation will be sent, unless otherwise ordered.

#### PRICE LIST.

1 inch, . . . . .	.20	9 inch, . . . . .	\$1.00
2 " . . . . .	.25	12 " . . . . .	1.25
3 " . . . . .	.35	18 " . . . . .	2.00
4 " . . . . .	.45	24 " . . . . .	2.50
6 " . . . . .	.65	36 " . . . . .	4.00
48 inch, . . . . .			\$7.00

## CENTRE GAUGES.

### No. 32.



Price, . . . . .	.25	Spring-Tempered, . . . . .	.40
------------------	-----	----------------------------	-----

Those not tempered will be sent, unless otherwise ordered.

## NARROW RULES.

### No. 33.



3-16 inch wide, No. 18 gauge, spring tempered, graduated one corner each side whole length, either in 32ds and 64ths, 50ths and 100ths, or 64ths and 100ths.

#### PRICE LIST.

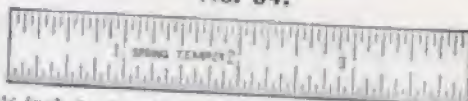
4 inch, . . . . .	.45	6 inch, . . . . .	.65
9 inch, . . . . .			\$1.00



# L. S. STARRETT, ATHOL, MASS.

## SHRINK RULES.

No. 34.



Allowing  $\frac{1}{8}$  inch to the foot. These rules are spring tempered, and of same width and thickness as No. 30 rules, spring-tempered. Graduated as follows:

### No. 2 GRADUATION.

1st corner, . . . . .	16, 20, 50, 100
2d " . . . . .	12, 24, 48
3d " . . . . .	16, 32, 64
4th " . . . . .	8

Price, 12 inch, . . . \$2.00

### No. 4 GRADUATION.

1st corner, . . . . .	64
2d " . . . . .	32
3d " . . . . .	16
4th " . . . . .	8

24 inch, . . . \$4.00

I also make a *flexible* Shrink Rule, graduated 32ds and 64ths on one side only. Prices same as above.

## SHRINK AND STANDARD RULES.

No. 34 SS.

Shrink on one side ( $\frac{1}{8}$  inch to the foot), and Standard on the other. No. 4 graduation. Same width and thickness as No. 30 Spring-Tempered Rules.

Price, 12 inch, . . . \$2.00      24 inch, . . . \$4.00

## BRASS SHRINK RULES.

No. 34 B.

Allowing  $\frac{3}{16}$  inch to the foot. No. 2 and No. 4 graduations. Same width and thickness as No. 30 Spring-Tempered Rules.

Price, 12 inch, . . . \$2.00      24 inch, . . . \$4.00

## DOUBLE SHRINK RULES.

No. 34 D.

Allowing  $\frac{1}{4}$  inch to the foot. No. 2 and No. 4 graduations. Same width and thickness as No. 30 Spring-Tempered Rules.

Price, 12 inch, . . . \$2.00      24 inch, . . . \$4.00

## MISCELLANEOUS RULES.

(U. S. Standard.)

No. 24.

From light, spring-tempered steel, graduated whole length.

A. One side, 10ths and 50ths; the other, 50ths and 100ths.

B. " " 32ds and 64ths; " " 50ths and 100ths.

The prices for these are the same as charged for No. 30 Rules of No. 4 graduation, page 20.



# L. S. STARRETT, ATHOL, MASS.

## SPRING STEEL DESK RULES,

For Draughtsmen, Book-Keepers, Etc.

No. 70.



These Rules are thin, light and handsome; of spring-tempered steel, about 1 inch wide and 3-64ths inch thick, nicely finished and nickel plated.

One edge is sharply beveled, so that ink won't stick to it. This prevents blotting the paper and smearing the fingers.

The thinness of the rule brings the working edge close to the paper, which is an advantage any one will appreciate who has done hit-or-miss ruling with a common ruler, the edge of which stands up quarter of an inch from the work. With Starrett's, you draw the line just where you want it.

Made both plain and accurately graduated on one edge in 16ths of an inch.

### PRICE LIST.

12 inch, plain,	.	.	.	.	.	\$ .50	Graduated, \$ .75
15 " "	.	.	.	.	.	.75	" 1.10
18 " "	.	.	.	.	.	1.00	" 1.40

Other graduations made to order.



# FINE MECHANICAL TOOLS.

## STARRETT'S PATENT KEY-SEAT RULE.

No. 105.

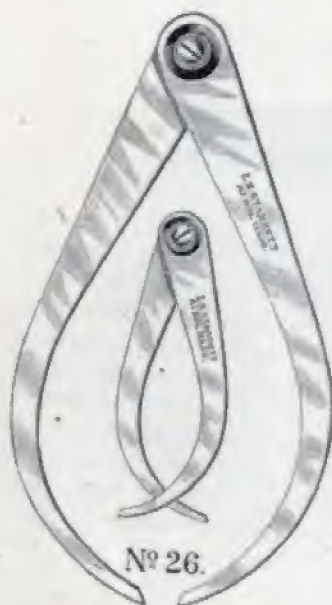


The improved feature in this Rule consists of a device for holding two straight edges in the form of a box square (or key-seat rule) securely together. One of said straight edges is a spring-tempered scale, graduated in 8ths, 16ths, 32ds and 64ths, the other a plain straight edge with two or three clamps (according to its length) which are operated by knurled eccentrics clamping corner and edge of straight edge and scale together; thus, not only allowing the scale to be used as such independently from the other part, but being in two straight pieces admits of being made from spring-tempered stock and accurately ground, also of inserting in place of the regular width rule, a narrow auxiliary one, adapting it for use on very small shafts, etc. This narrow auxiliary straight edge is either plain or graduated in 32ds and 64ths, and sent when ordered.

### PRICE LIST.

6 inch,	.....	\$2.25
6 "	with auxillary straight edge, plain,	2.75
6 "	" " " " graduated,	3.00
9 "	.....	3.00
9 "	with auxillary straight edge, plain,	3.75
9 "	" " " " graduated,	4.25

## STARRETT'S IMPROVED FIRM-JOINT CALIPERS.



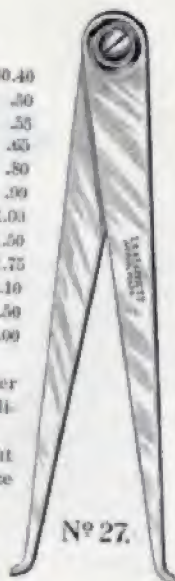
No 26.

### PRICE LIST.

3 inch, . . . .	\$0.40
4 " . . . .	.50
5 " . . . .	.55
6 " . . . .	.65
8 " . . . .	.80
10 " . . . .	.99
12 " . . . .	1.00
14 " . . . .	1.50
16 " . . . .	1.75
18 " . . . .	2.10
20 " . . . .	2.50
24 " . . . .	3.00

The above sizes refer to the *length* of the Calipers.

Their capacity is about  $\frac{1}{2}$  greater than the size given.



No 27.

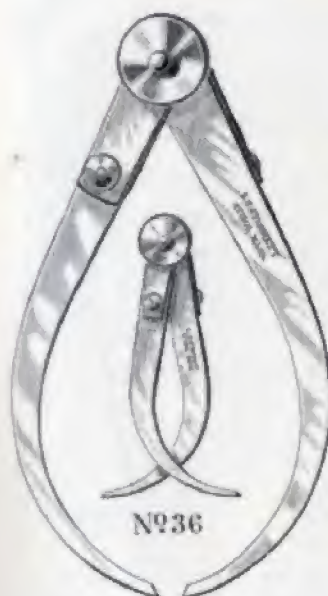
The improvement in these Calipers consists in the construction of the joint, which is so made as to be drawn together by means of a screw forcing a washer onto a squared end of the main rivet which extends through the legs, thus clamping them together between bearings so shaped as to insure a smooth and uniform friction, of more or less tension, to suit the user.

The quality of these Calipers is incomparably superior to that of any old style riveted-joint caliper on the market.

# FINE MECHANICAL TOOLS

STARRETT'S

## LOCK-JOINT TRANSFER CALIPERS.



### PRICE LIST.

4 inch, . . .	\$1.25
6 " . . .	1.50
8 " . . .	1.75
10 " . . .	2.00
12 " . . .	2.25
14 " . . .	2.50
16 " . . .	2.75
18 " . . .	3.00
20 " . . .	3.50
24 " . . .	4.25

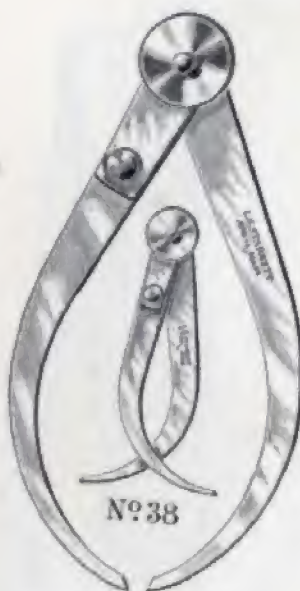


These instruments, (Nos. 36 and 37) not only have all the excellent features of Nos. 38 and 39, as described on another page, but in addition to common use may be used inside of chambered cavities, over flanges, etc, removed and replaced without losing the size calipered. This is done by loosening the nut, binding one arm to the auxiliary leaf and swinging it out or in (while the joint is locked) to clear the obstruction, then moving it back-against a stop, where it will show the exact size measured.

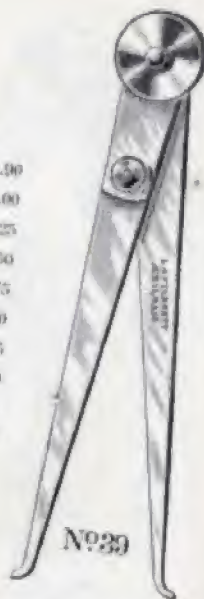
The sizes given refer to the length of the calipers, but the outside ones will caliper a cylinder 20 per cent. larger than their length, and the inside calipers will open nearly twice their length. This applies also to Nos. 26 and 27 on the preceding page, as well as to Nos. 38 and 39 following.



## STARRETT'S LOCK-JOINT CALIPERS.



PRICE LIST.	
4 inch,	\$ .30
6 "	1.00
8 "	1.25
10 "	1.50
12 "	1.75
14 "	2.00
16 "	2.25
18 "	2.50
20 "	2.75
24 "	3.50



These cuts represent long needed tools, viz., simple, light, low-priced and reliable calipers of wide scope for both inside and outside work, that can be instantly adjusted to their full extent, and as quickly locked firm in the joint, and yet provided with a sensitive adjustment. They are made to supercede the old style firm joint, also the lock joint with split leg adjustment I formerly made. The improvement consists, first in a socket joint made tapering, and locked or released by a partial turn of the knurled disc drawing it together. A spring washer under the disc maintains an easy friction in the joint when unlocked.

To further describe, in the under side of short arm is a slot containing a stiff spring. Riveted into the middle leg and projecting through an opening in the arm, is a threaded stud on which is a knurled nut having a beveled hub — this bears against a cone in the arm — the action of the spring holding them together turning the nut, presses them apart and adjusts the leg while the joint is locked. The spring taking up all back lash the legs are firm.

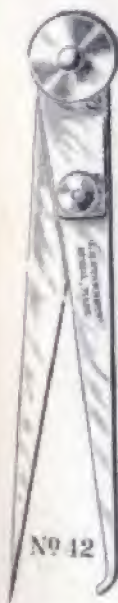
# FINE MECHANICAL TOOLS.

## HERMAPHRODITE CALIPERS.

No. 42.

With lock joint and sensitive adjustment. A good thing.

Price, 4 inch,	. . . . .	\$ .90
" 6 "	. . . . .	1.00
" 8 "	. . . . .	1.25
" 10 "	. . . . .	1.50



## NEW DIVIDERS.

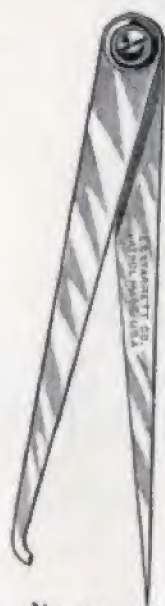
No. 43.

With my improved lock joint attachment and sensitive adjustment. It is light and stiff, with large capacity, instantly opened, closed and locked. The points are nicely tempered.

Price, 6 inch,	. . . . .	\$1.00
" 8 "	. . . . .	1.25
" 10 "	. . . . .	1.50



## NEW FIRM-JOINT HERMAPHRODITE CALIPERS.



No. 41.

These Calipers have the improved firm-joint which has made our No. 26 Outside and No. 27 Inside Calipers deservedly popular among mechanics. This joint, with its smooth and uniform friction, is incomparably superior to the old styled riveted joint which has so long been a prolific cause of "cuss words" among those who have used it.

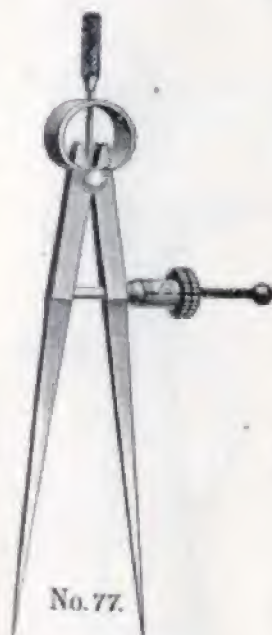
PRICES.			
3 inch, . . . . .	\$0.40	8 inch, . . . . .	\$0.80
4 " . . . . .	.50	10 " . . . . .	.90
5 " . . . . .	.55	12 " . . . . .	1.00
6 " . . . . .	.65		



# FINE MECHANICAL TOOLS.

## FAY'S PATENT SPRING DIVIDERS,

With Spring Nut.



No. 77.



SPRING NUT

The Fay Calipers and Dividers, Nos. 74 to 77, all sizes, are sent *with Spring Nut* unless otherwise ordered.

The above cut represents my Spring Dividers with new quick-adjusting, automatic closing spring nut, a critical examination of which will at once show its superiority over all others on the market. Its use will save much valuable time in opening and closing spring-bow calipers and dividers.

They are also made with a solid nut.

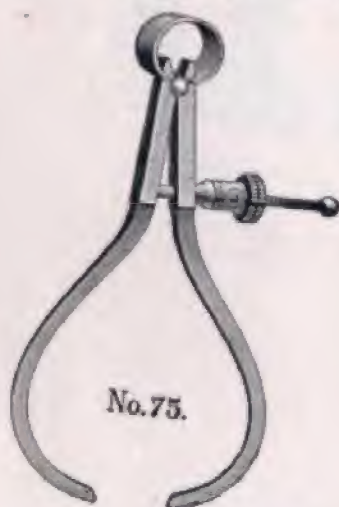
There is up spring nut made for 3/4 and 1 inch.

### PRICE LIST.

2 1/2 inch, each, with spring nut,					with solid nut,				
3	"	"	"	"	1.15	"	"	"	\$1.00
4	"	"	"	"	1.15	"	"	"	1.00
5	"	"	"	"	1.40	"	"	"	1.25
6	"	"	"	"	1.40	"	"	"	1.25
7	"	"	"	"	1.75	"	"	"	1.50

## FAY'S PATENT OUTSIDE AND INSIDE CALIPERS. With Spring Nut.

No. 74 represents a new Inside Transfer Caliper, with either solid or spring nut. The bow is stiff, making the caliper reliable. After calipering inside a chambered cavity, by pressing the legs together they may be withdrawn, and as they spring back will show the exact size calipered.



No. 75.



No. 74.

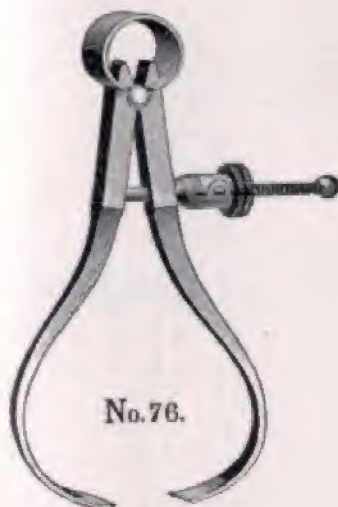
### PRICE LIST.

OUTSIDE, No. 75.			INSIDE, No. 74.		
	Solid Nut.	Spring Nut.		Solid Nut.	Spring Nut.
2 1/4 inch,	\$1.00	\$1.15	3 inch,	\$1.00	\$1.15
3 "	1.00	1.15	4 "	1.10	1.25
4 "	1.10	1.25	5 "	1.10	1.25
5 "	1.10	1.25	6 "	1.25	1.50
6 "	1.25	1.50			

These Calipers will be sent with spring nut unless otherwise ordered.

# FINE MECHANICAL TOOLS

## FAY'S PATENT THREAD AND INSIDE CALIPERS.



No. 76.



No. 78.

### PRICE LIST.

#### THREAD, No. 76.

	<i>Solid Nut.</i>	<i>Spring Nut.</i>
3 inch, . . . . .	\$1.00	\$1.15
4 " . . . . .	1.10	1.25
5 " . . . . .	1.10	1.25

#### INSIDE No. 78.

	<i>Solid Nut.</i>
4 inch, . . . . .	\$1.10
5 " . . . . .	1.10

No. 78 Inside Calipers are not made to receive the spring nut.

Duplicate parts for either style and size of Fay Caliper or Divider will be forwarded to any address, postpaid, on receipt of the following

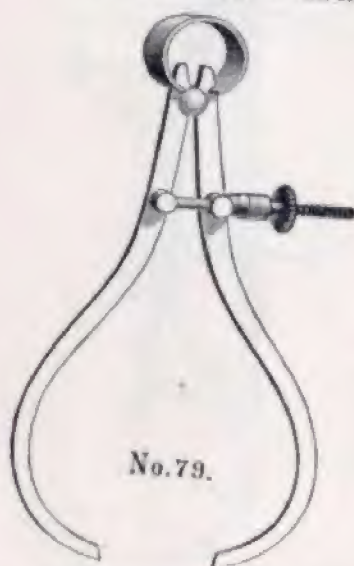
### PRICES.

Screw and Ball, . . . . .	.15	Leg, . . . . .	.35
Thumb Attachment, . . . . .	.15	Spring, . . . . .	.25
Solid Nut, . . . . .	.10	Jam Washer, . . . . .	.10
Spring Nut, . . . . .	.25	Fulcrum Stud, . . . . .	.10



## YANKEE OUTSIDE AND INSIDE CALIPERS.

The Yankee Calipers and Dividers are manufactured under the Fay patent, are not quite so heavy as the Fay, and cost less. They are much liked, and on account of price are preferred by many to the higher cost tools.  
All sizes are supplied with either solid or quick-adjusting nut.



No. 79.



No. 73.

No. 73 represents a new Yankee Inside Transfer Caliper with either spring or solid nut. The bow is stiff making the caliper reliable. After calipering inside of chambered cavity by springing in the legs they may be withdrawn, and as they spring back will show the exact size calipered.  
Five sizes are made, 3, 4, 5, 6 and 8 inch. Price same as outside.

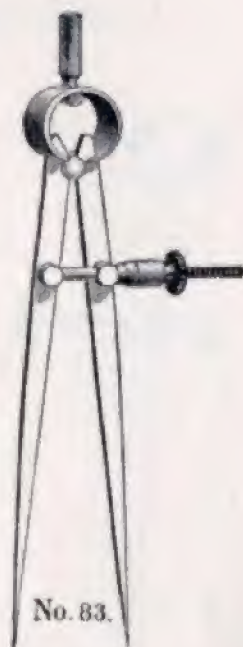
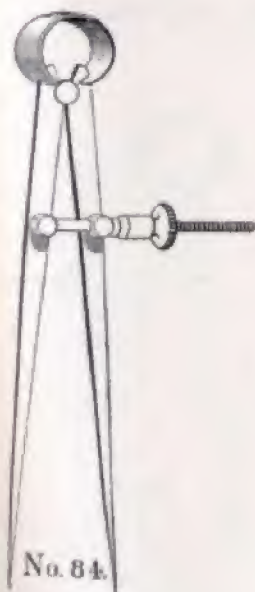
### PRICE LIST.

Outside Calipers				Inside Calipers			
Size	Material	Each	Price	Size	Material	Each	Price
2 1/4 inch	with solid nut	each	\$ .55	2 1/4 inch	with spring nut	each	\$ .50
3 "	" " " "	"	.70	3 "	" " " "	"	.95
4 "	" " " "	"	.75	4 "	" " " "	"	1.00
5 "	" " " "	"	.80	5 "	" " " "	"	1.05
6 "	" " " "	"	.85	6 "	" " " "	"	1.10
8 "	" " " "	"	1.00	8 "	" " " "	"	1.15

Sent with solid nut unless otherwise ordered.

# FINE MECHANICAL TOOLS

## YANKEE SPRING DIVIDERS.



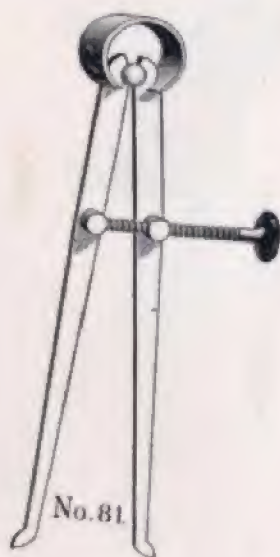
These Dividers are furnished with spring nut when ordered, at an extra cost of 25 cents each.

### PRICE LIST.

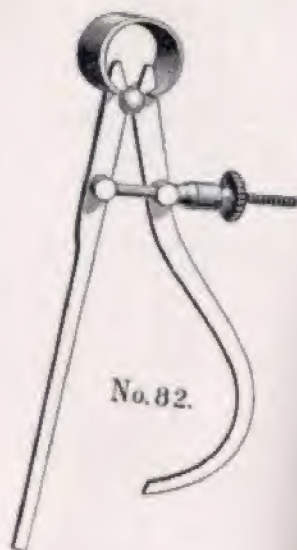
	No. 84.		No. 83.	
2½ inch, each,		\$ .65	With thumb attachment	\$ .80
3 " "		.70	" " "	.85
4 " "		.75	" " "	.90
5 " "		.80	" " "	.95
6 " "		.85	" " "	1.00
8 " "		1.10	" " "	1.25

YANKEE

## INSIDE AND KEYHOLE CALIPERS



INSIDE CALIPER.



KEYHOLE CALIPER.

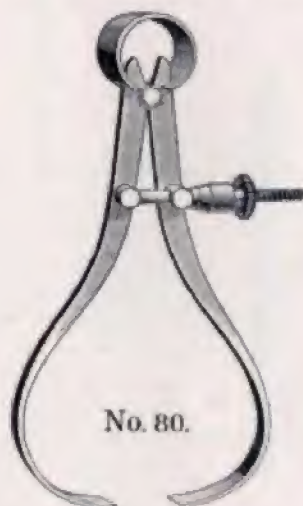
### PRICE LIST.

INSIDE CALIPERS.— 4 inch, with solid nut, each,									
"	"	5	"	"	"	"	"	"	75 cents.
"	"	6	"	"	"	"	"	"	80 "
KEYHOLE CALIPERS.— 3 inch, with solid nut, each,									
"	"	4	"	"	"	"	"	"	85 "
"	"		"	"	"	"	"	"	70 "
"	"		"	"	"	"	"	"	75 "



# FINE MECHANICAL TOOLS.

## YANKEE THREAD CALIPERS.



No. 80.

PRICE, 3 inch, with solid nut, . . . . .	\$ .75	With spring nut, . . . . .	\$1.00
" 4 " " " " " . . . . .	.90	" " " " " " . . . . .	1.15
" 5 " " " " " . . . . .	1.00	" " " " " " . . . . .	1.25

## DUPLICATE PARTS

for either size of Yankee Caliper or Divider will be forwarded to any address, post-paid, on receipt of price.

## PRICE LIST.

Screw and Ball, . . . . .	.15	Spring, . . . . .	.25
Thumb Attachment, . . . . .	.15	Jam Washer, . . . . .	.10
Solid Nut, . . . . .	.10	Fulcrum Stud, . . . . .	.10
Spring Nut, . . . . .	.25	Stud, . . . . .	.10
Leg, . . . . .	.25		

### SURFACE GAUGE.

No. 52.



I have now perfected this tool by substituting for the old the most perfect working and firmly grasping snug and needle clasp ever devised.

Space forbids a detailed description of the advantages of this gauge. Suffice it to say, that for accuracy, convenience, and effectiveness, I warrant it superior to all others.

The IMPROVED SLEEVE with needle clasp will fit all my gauges as formerly made, and I will exchange the new for the old, with all who send theirs in together with 50 cents. But to those wishing the improved sleeve, who do not send in the old, price will be \$1.00. Give size of spindle for which sleeve is wanted.

PRICE LIST.

	PRICE LIST.	
8 inch,	.	
12 "	.	
12 " with 6 inch extension,	.	\$2.00
	.	2.75
	.	3.25

# FINE MECHANICAL TOOLS

## STARRETT'S MICROMETER SURFACE GAUGE.



No. 53.

This Gauge has a turned and polished base, a Micrometer adjusting nut reading 1000, and a six-inch extension for the spindle. By means of springs and taper fitting parts of the sleeve, (not shown in cut), the scriber is held by slight friction in any position while adjustments are made, and firmly held by a turn of the nut. A knurled cam on the base releases and locks the spindle for adjusting.

### PRICES.

8 inch, without extension, . . . .	\$2.50
12 " " " " " " " " " " " "	5.50
12 " with " " " " " " " " " "	4.00

In ordering, give the size wanted.

## SURFACE GAUGE ATTACHMENT.

No. 54.



Cut above shows a Surface Gauge Attachment to be used between the centers of a lathe to adjust, locate, and lay out work secured to the face plate. An auxillary arbor is supplied size of No. 53 Surface Gauge 12 inch Spindle, the sleeve fitting both spindle and arbor.

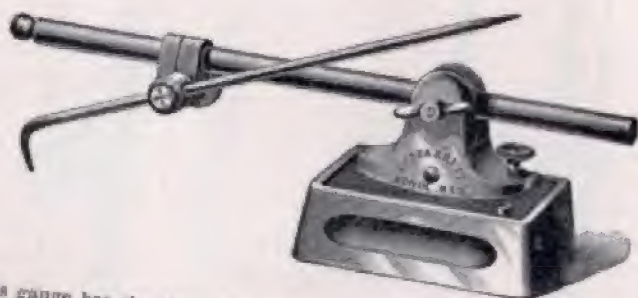
Those having the Surface Gauge will need the arbor only.

Price of the Auxillary Arbor, . . . . 50 Complete, \$1.50



## STARRETT'S UNIVERSAL SURFACE GAUGE.

No. 55.



This gauge has the following improved features, viz.: a joint at the base which allows the spindle and scriber to be moved back and forth and placed in any position from upright to horizontal to reach over, back of and under work that could not be got at with old style gauges, while by inclining the spindle over the work its scope for long reach is increased.

The fine adjustment is nicely obtained by the knurled screw in the rocking bracket at the base acting against a stiff spring under the opposite end, while the joint above with the spindle may be set and rigidly held in any position desired. Two pins through the base, frictionally held, may be pushed down by slight pressure to form a bearing to work from the edge of, or in the slots of the planer bed for lining up work, while the weight of the gauge against the bed with a little pressure is sufficient to push them back. Grooves around these pins, against which a pointed spring plunger presses, insure their being held in place either up or down. Concave depressions infilled in the sides of the base make it convenient for thumb and finger to grasp.

This gauge is furnished with my improved sleeve which rigidly holds the scriber.

The gauge is nicely made in two sizes, with spindles of extra length to order.

PRICE, 9 inch,	
" 12 "	
" with two spindles 12 and 18 inches,	\$2.50
	3.00
Extra spindles of any length furnished at a rate of 3c. an inch,	3.50

# FINE MECHANICAL TOOLS.

TOOL-MAKERS'

## UNIVERSAL SURFACE GAUGE.

No. 56.



This little tool fills the bill for a gauge adapted for light work. It is made on the principle of my new No. 55. The base is steel, nicely finished and *case hardened*, with depressions milled in the sides for the thumb and finger to grasp. The top side of it is slotted, and the rocking bracket is pivoted in the same. There is a stiff spring under one end of the bracket and a knurled adjusting screw in the other; the spindle jointed to this may be set and rigidly held in any position from vertical to horizontal, and the scriber placed in position to be used below its base for Depth Gauge, or (with bent end down) a Scribing Gauge. It weighs but 11 ounces and is 5 inches high, and, folding the spindle (which is 4 inches long) horizontally over the base, it may be packed in  $1\frac{1}{2} \times 1\frac{1}{2} \times 4$  inches space in the tool chest. A more convenient or pleasing tool of the kind does not exist.

PRICE . . . . . \$3.00

## STARRETT'S IMPROVED EXTENSION DIVIDER.



This is a well-made, nicely-finished Divider, with auxiliary caliper legs, which, together with a common pencil, form convenient combinations. My patent locking nut between the arms, against which a spiral spring acts, is a valuable feature. After the fine adjustment is made, the nut may be turned back, locking spring and arms firmly, thus remedying the weak point which renders the common wing divider only as stiff as the adjusting spring. A full-threaded nut on the stud, through which the quadrant passes, is a more durable fastener than two or three threads tapped in the arm to hold the wing of the old style. The head and arms of this tool are made from best malleable iron, the rest of steel. The points are hardened and warranted first-class. The smallest size is 7 inches long; by adjustment of points becomes 9 inches, and will scribe a 22 inch circle; will caliper 11 inches outside and 13 inches inside. The second size is 9 inches; by adjustment of points becomes 12 inches, and will scribe a 30-inch circle, and caliper 14 inches outside and 16 inches inside. The dividers will be sold without caliper legs *when so ordered*.

### PRICE LIST.

7 inch, with Divider Legs only,	\$1.25
9 " " " " " " " " " "	1.50
7 " complete,	2.25
9 " " " " " " " " " "	2.50

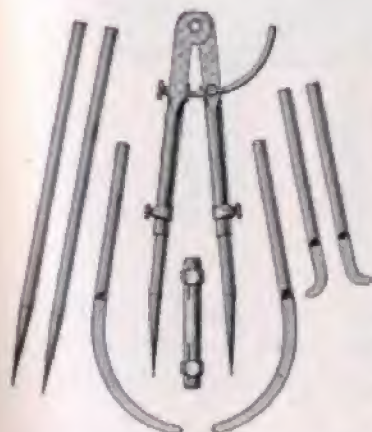


# FINE MECHANICAL TOOLS.

## STARRETT'S IMPROVED BRONZE DIVIDER.

NICKEL PLATED.

No. 90.



The head and socket legs of this tool are made from drawn (not cast) bronze metal, and are hard, tough, strong, *finely finished*, and nickel plated.

The joint is large and firm. My patent locking nut between the arms, against which a spiral spring acts, is a valuable feature. After the fine adjustment is made, the nut may be turned back, locking spring and arms firmly, thus remedying the weak point in the common wing divider, which is only as stiff as the adjusting spring. The quadrant is fastened by my improved method.

A common pencil fits either socketed leg, while an auxiliary holder fits reversed end of either short point for an extension. The head, with short point, is 8 inches long; may be extended 2 inches more; will caliper 16 inches outside and  $12\frac{1}{2}$  inside. With short points will scribe a 24 inch, and with long points a 34 inch circle.

THICK, with points only, . . . . .	\$2.25
" Set complete, . . . . .	4.00

Sent complete unless otherwise ordered.

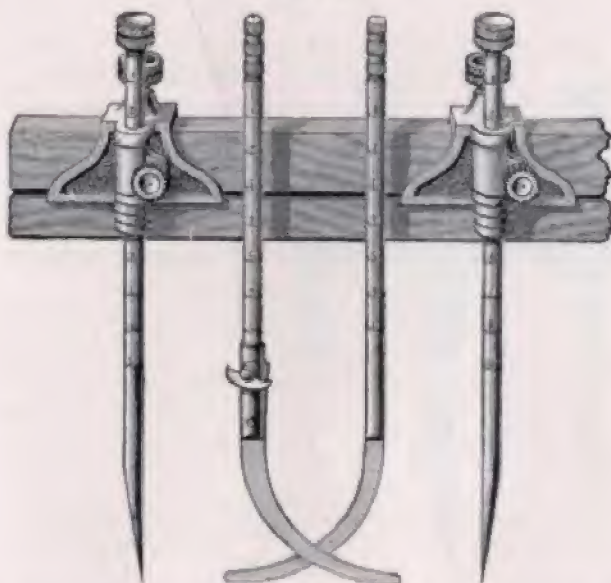
### EXTRA PARTS.

Long Points, . . . . .	.50
Outside or Inside Caliper Legs, . . . . .	.50
Auxiliary Pencil Holder, . . . . .	.40
Extra Long Points, (scribe 44 inch circle) made to order, . . . . .	.60



## EXTENSION BEAM TRAMMELS.

No. 51.



The above cut represents a pair of trammel heads, with an opening through the underside to accommodate the extension, giving width and stiffness in proportion to the length required for large work, while it is equally well adapted to receive a narrow beam for light work.

The points are eccentric, and may be loosened and rotated in their sockets to make fine adjustments. Either point may be removed and a common pencil inserted.

One of the caliper legs is provided with a joint, worked by an eccentric thumb piece for fine adjustments.

The marks on legs enable them to be adjusted in proper relation to each other.

PRICE, complete, . . . . .	\$3.35
“ without caliper legs, . . . . .	2.50

Sent complete unless otherwise ordered.



# L. S. STARRETT, ATHOL, MASS.

## IMPROVED TRAMMEL POINTS.

No. 50.



Made of bronze metal, with forged steel points, hardened.  
Either point can be removed, and the pencil socket accompanying each pair put in its place.  
Adjustable like *spring dividers*.  
Light and durable.

### PRICE LIST.

With 3-inch points, adjustable, . . .	\$2.50
With 3-inch points, not adjustable, .	1.50
Extra long points, 5-inch, per set, .	.35

### LEGAL DECISION.

In the Circuit Court of the United States, District of Massachusetts, January 31, 1883, Judge Lowell rendered a decision in the suit brought by L. S. Starrett, of Athol, State of Mass., against *The Standard Tool Co.*, for infringing his patented squares, *fraudulently stamping and advertising them as Chaplin's Patent*. The Court sustained both of Mr. Starrett's patents, and declared them infringed, and an injunction was ordered against the defendants. To evade this injunction, they made a slight change in the tool, and continued to make and sell them, whereupon legal action was at once taken terminating in a decree from Judge Lowell, imposing a fine of \$100 in addition to costs and damages.

**CAUTION.**—Having established my rights, I hereby give notice that I shall hold all persons responsible who use or sell any infringement on my squares.

Since above decisions, the same unprincipled parties, having further mutilated my patent, are deceiving mechanics and the trade by showing a cut of my patent squares, while they are making an inferior and imperfect tool which cannot on one side be laid flat on the work, making its use for accurate results impossible. Let none be deceived.

L. S. STARRETT.

# FINE MECHANICAL TOOLS.

## COMBINATION STRAIGHT EDGE.

No. 167.



The above cuts show top, edge and under side of my improved straight edge. This is slightly raised from the paper by oval-headed rivets, to prevent it from soiling the paper, and adapts it for inking without blotting.

The needle carriers at each end swing on taper studs, and carry needle-pointed brads frictionally held in their split ends. These may be swung to bring the points close to the working edge, and by a slight turn of a knurled nut may be rigidly locked, holding the straight edge bradded to the paper. Using one brad secured at the working edge, and swinging the jointed arm, see cut No. 165, (the protractor being removed) over against the straight edge to form a corner to place pencil, circular lines may be struck any desired size, and radial lines drawn to perfection. The straight edges, either graduated or plain, will be furnished with the brad carriers without the other attachments, or with any or all of them, making a complete set—the different lengths governing the price. Those having use for the set will highly appreciate it. These are also furnished plain, without carriers or rivet heads.

### PRICES.

18-in. long, 1½ wide, not grad.	\$2.25, grad.	\$3.00.		
24 " " " " " "	2.75, " "	3.50.	Plain straight edges, without carriers or rivets,	\$1.50
30 " " " " " "	3.50, " "	4.75.		2.00
36 " " 1½ " " " "	4.25, " "	5.50.		2.50
42 " " " " " "	5.00, " "	6.75.		3.00
48 " " " " " "	5.75, " "	8.00.		3.75
				4.50

Extra needle points 70 cents per dozen; extra needle holders 10 cents each. In ordering the latter, mention the width of straight edge blade.

## ADJUSTABLE METAL EDGE, No. 168.

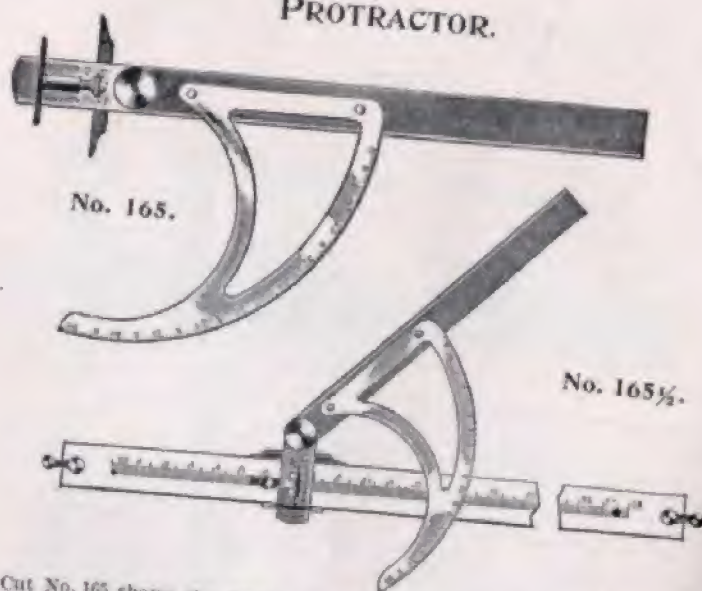
We furnish a metal T rail, or straight edge with attachments to secure it to end, or end and side of draughting board or table. These are ground perfectly straight and are nickel plated. The T square used against this insures more accurate results than could be obtained by working against a wooden board or table.

### PRICE LIST.

16-in., \$1.35,	18-in., \$1.50,	19-in., \$1.60,	20-in., \$1.70,	21-in., \$1.80
23 " 1.90,	24 " 2.00,	26 " 2.20,	27 " 2.30,	28 " 2.40
30 " 2.50,	32 " 2.65,	34 " 2.85,	36 " 3.00,	38 " 3.20
40 " 3.35,	48 " 4.00,	60 " 5.00,		

# L. S. STARRETT, ATHOL, MASS.

## PROTRACTOR.



Cut No. 165 shows the Bevel Arm and Protractor. No. 165 1/2 shows the same and Section Liner as applied to No. 167 Straight Edge. The Protractor arm is jointed to a clasp which slides on the Straight Edge, or may be locked to it at will. This may be set at an angle (either way), and the joint locked by a slight turn of the knurled disc forcing it together. The Protractor is 1/4 of a 14 inch circle, and is graduated as fine as 1/4 degrees. This by steady plus accurately fits (either side up), the jointed arm. Reading by the edge of the blade, the arm may be set to any degree, or finer as desired, and the Protractor removed so as not to obstruct the work.

An Improved Section Liner is provided, attached to the clasp (see larger cut of this, No. 166). This is in the form of a knuckle joint, and feeds against the graduation marks cut in the surface of the Straight Edge or T Square. By thumb pressure on the button-headed screw, which may be adjusted to a fine or coarse movement, hatching may be rapidly and evenly done, and for accurately spacing work for draughting to the scale of 1-16, 1/8, or 1/4 to foot, the device is a great convenience. Pressing the button two or more times, any desired distance can be quickly and evenly spaced off, and with the assurance that no mistake is made, as is liable when other means are employed.

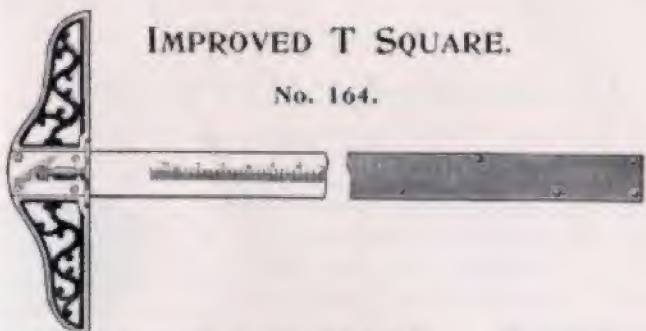
### PRICE LIST.

Protractor only, . . . . .	\$5.00	
Jointed Blade, 15 inch, . . . . .	6.00	With Protractor, \$10.00
" " 24 " . . . . .	6.00	" " 11.00
" " 36 " . . . . .	7.00	" " 12.00
With Section Liner, . . . . .	3.00 extra.	

Long auxiliary blades for interchangeable use, with clasp, are supplied.  
 Price, 24 inch, \$2.00; 36 inch, \$2.50.



# FINE MECHANICAL TOOLS



IMPROVED T SQUARE.

No. 164.

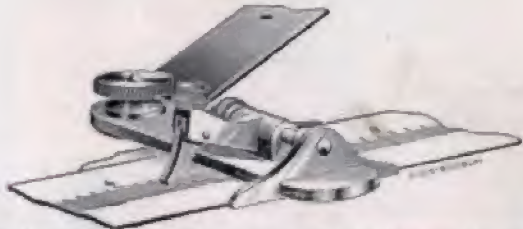
Cut No. 164 represents a nickel-plated T Square with spring-tempered blade, and having wafer-headed rivets on its under side to slightly raise the blade above the paper to prevent soiling, and to adapt it for inking without blotting. The top and under side of blade are shown. The head has an automatic clasp device to hold it by spring pressure against a *metal straight edge* attached to the end, or end and side, of a draughting board or table (see description of metal edge, page 47), or, by a slight turn of knurled nut, locked firm. The top side of the blade graduated forms a scale to set dividers, etc., and a feed rack, for section liner to work against, to move jointed blade (as shown in cut No. 165½ used with combination straight edge). The Square will be furnished plain or graduated.

## PRICES OF IMPROVED T SQUARE.

22 x 1½	inch blade, 10 inch head, not grad., .	\$3.75,	grad., \$4.25
26 x 1½	" " 10 " " " " " " " " " "	4.25,	" 5.00
32 x 1½	" " 10 " " " " " " " " " "	5.00,	" 6.00
36 x 1½	" " 13 " " " " " " " " " "	5.75,	" 7.00
42 x 1½	" " 13 " " " " " " " " " "	6.50,	" 8.00
48 x 1½	" " 13 " " " " " " " " " "	7.50,	" 9.50

## STARRETT'S SECTION LINER.

No. 166.



This cut shows the Section Liner more plainly than cut No. 165½. This is hinged to the clasp connected with jointed blade. Its hardened steel dog feeding against the graduation marks in the center of spring-tempered square blade or straight edge, moves it with uniform evenness as fine or coarse as desired, the throw being regulated by turning the adjusting nut. It should be understood that the Section Liner can only be used in connection with my graduated T square blades and combination straight edges, etc. With these it is a wonderful help to the draughting fraternity.

PRICE, . . . . . \$3.00

# L.S. STARRETT, ATHOL, MASS.

## STARRETT'S IMPROVED SPEED INDICATOR.

No. 106.

This is a nicely made and fine working indicator. The working parts are enclosed like a watch, and as well made. The graduations show *every* revolution, and with two rows of figures read both *right* and *left* as the shaft may run. An auxiliary split cap is made to slip over the pointed spindle to adapt it to use on a center or pointed shaft. While looking on the watch each hundred revolutions may be counted by allowing the oval-headed pin on the revolving disc to pass under the thumb as the instrument is pressed to its work.

The dial is locked to a revolving stud—a slight thumb pressure and twist on the knurled eccentric releases it so that the indicator mark may be readily moved and locked to agree with the starting point, thus saving the necessity of turning the instrument to bring it there.

The instrument is nickel plated, and has either an ebony or rosewood handle, so that it will not heat the fingers when run at high speed.

Every indicator is warranted first-class.

Price, in pasteboard box, plain,	\$1.50
" " " " with split cap,	1.75

Morocco cases furnished to order at 50c. extra.  
Sent with split cap, unless otherwise ordered.



# FINE MECHANICAL TOOLS

## STARRETT'S HIGH-SPEED INDICATOR.

No. 104.

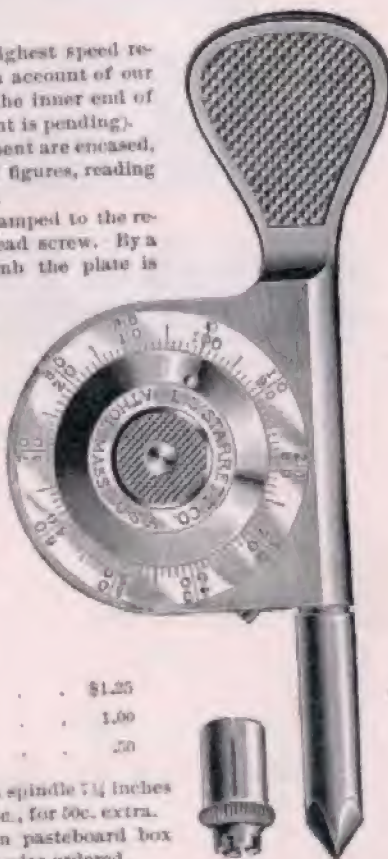
This Indicator may be run at highest speed required without heating, and this on account of our frictionless bearing against which the inner end of the spindle revolves (for which patent is pending).

The working parts of this instrument are encased, and the dial plate has two rows of figures, reading right and left, as the shaft may run.

The inner plate is frictionally clamped to the revolving gear by a checked wafer head screw. By a pressure and twist with the thumb the plate is loosened, when the O mark may be instantly moved to agree with the starting point, thus saving time revolving the spindle to bring it there.

Although this is a higher cost instrument we have listed it at the same price as the Indicator formerly listed as No. 102, but now discontinued.

It is furnished with split or plain cap, but to fit a pointed shaft the split cap is needed.



### PRICES.

With Split Cap, . . . . .	\$1.25
With Plain Cap, . . . . .	1.00
With Morocco Case, extra, . . . . .	.50

We supply the Indicators with a spindle  $7\frac{1}{4}$  inches long for use on Dairy Machines, etc., for 50c. extra.

The Indicator with split cap in pasteboard box (list \$1.25) will be sent unless otherwise ordered.



**L. S. STARRETT, ATHOL, MASS.**

## IRON LEVELS.

No. 100.



Iron Level with Double Plumb, No. 6, 9 inch.



Iron Level, No. 5, 6 inch, with Double Plumb.



Iron Bench Level, No. 4, 6 inch.

These Levels are equal (we think superior), to any others in the market.  
Every one is warranted accurate.

### PRICE LIST.

No. 1.	Bench level, 2 1/4 inch,	
2.	3 1/4	\$ .22
3.	4	.20
4.	6	.65
5.	double plumb, 6 inch,	.75
6.	9	1.50
7.	12	1.65
8.	18	1.75
9.	24	2.00
10.	24	2.25
11. Pocket	nickel plated, 2 1/4 inch,	.20
12.	3 1/4	.20

Order by number.

# FINE MECHANICAL TOOLS.

## NEW ADJUSTABLE BENCH LEVELS.

No. 95.



With ground and graduated vials,—accurate and very sensitive.

These levels are so constructed that they can be accurately adjusted, and when so adjusted are not liable to get out of truth, the vials being set in tubes having solid ends which are firmly clamped to the base. The tubes are nickel-plated, the bases japanned or nickel-plated.

### PRICE LIST.

4 inch, with ground vial,		\$2.25
6 " " " " and handle,		3.50
8 " " " " " "		4.00
4 " " plain vial,		1.00
6 " " " "		1.25
8 " " " "		1.50

With nickel-plated base, 15 cents extra.

In ordering, state whether ground or plain vial is required.

# L. S. STARRETT, ATHOL, MASS.

## TRANSIT.

No. 99.



This instrument is designed especially for Architects and Builders, who often require the use of a level and some instrument for the taking of angles, but do not feel like paying the price of an Engineer's Transit.

The instrument is composed of iron and brass, and consists of a tripod, to the head of which is connected by a ball and socket joint an upper plate, which can be leveled by the leveling screws. This plate is recessed to contain a graduated arc for taking angles. On this plate rests a triangular frame, to which is attached a level, a graduated arc for taking vertical angles and a sight tube. The plain sight tube has no lenses, is brass, twelve inches long, in one end is a small eye aperture, in the other the usual cross wires.

The telescope has cross lines, is adjustable to distances, and is same size and length as plain sight tube.

With short legs, as shown in the cut, the instrument is eight inches high. With long extension legs, which fasten on over the short, the height can be from two feet eight inches to four feet eight inches. The sight tube, level case and graduated arcs are nickel plated, the other parts are japanned.

The advantages of this Transit are as follows: The head is held to the tripod with a bolt and nut, so as to make it stationery at any given point; the graduated arc can be clamped to the base plate by throwing a small cam arrangement.

All points taken into consideration, this Transit is one of the best of its kind in the market. It is adapted to almost all kinds of work, and is made of the best of materials, and adjusted by skilled workmen. It is warranted perfect and accurate in every respect. When packed and ready for shipment, it weighs about 15 pounds.



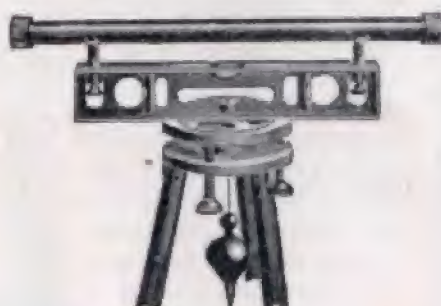
## FINE MECHANICAL TOOLS

PRICE LIST. (Transit No. 99.)

With plain sight tube and long legs,	\$16.50
" " " " " short legs,	15.00
" " " " " long legs and ground level vial,	18.00
" " " " " short legs " " " " "	16.50
" telescope, long legs and ground level vial,	28.00
" " short legs " " " " "	26.50
Compass, about 2 inches diameter, extra,	5.00
Target to go on common ten foot pole, extra,	1.50

### LEVELING INSTRUMENT.

No. 101.



Warranted to be true in every respect.

The best, the cheapest and most durable in the market for the money.

It is adapted for the use of Architects, Carpenters, Builders, Stone Masons, and others, for leveling, getting angles, etc.

It is made of iron and brass, which is japanned and nickeled, and of all brass, nickeled. It weighs, when packed in box for shipment, 12¾ pounds. Directions sent with instrument.

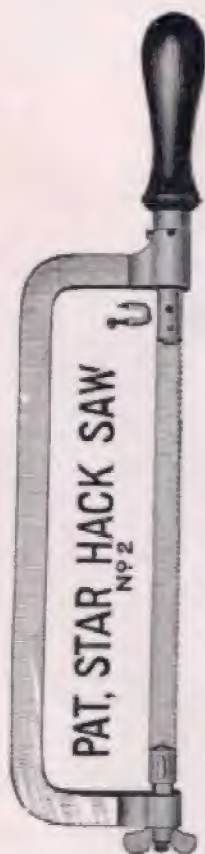
PRICE LIST.

Japanned, nicked tube, . . . . .	\$12.20
"    "    "    with surveyor's ground glass in level, . . . . .	14.00

# L. S. STARRETT, ATHOL, MASS.

## HACK SAWS.

No. 103.



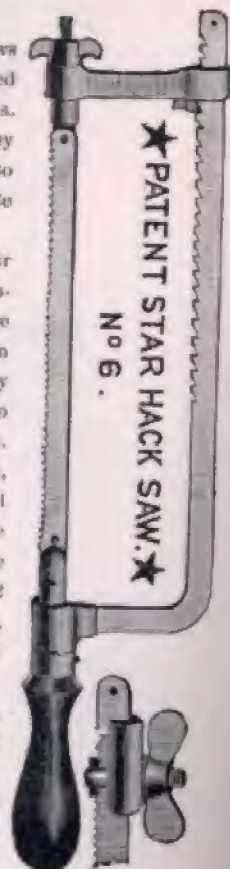
Being convinced that these saws are the *best* made, I have arranged to supply them with my tools. The teeth are so hard that they cannot be filed, and the prices so low that it would never pay to file them even if they were soft.

On account of high temper their cutting and wearing qualities cannot be excelled. The *frames* are made to hold the saws facing in four different directions. They also have connecting pins so shaped that they cannot fall out. No. 6 is a patented Steel Frame, heavy and stiff, is highly polished and heavily nickel plated. The handle is ebonyized. This Frame will hold all blades from 6 to 12 inches, and with the extra clamp, as seen in the cut, will hold all broken blades.

No. 2 is a solid frame, steel, polished and nickeled, to hold 8 inch saws.

Notice that blades and frames are listed separately, and order accordingly.

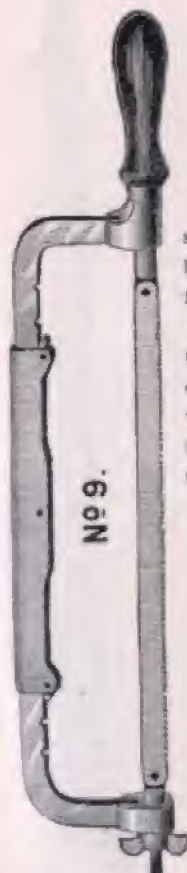
For prices see next page.



# FINE MECHANICAL TOOLS.

## HACK SAWS.

No. 103. (Continued.)



This is an extension frame, covered by a steel sheath, as seen in cut. The sheath makes it very stiff, while it is very light. It is polished and nickel plated, and will hold blades facing in either direction. This frame is a general favorite.

N. B.—The Hack Saws for standard use have fourteen teeth to the inch, and these will be sent unless otherwise ordered. For sawing tubing, thin sheet metal, and for FINE WORK, 23 teeth to the inch are cut on all lengths from 8 inches to 12 inches. Prices for those with coarse or fine teeth are the same.

### PRICE LIST.

No. 2 Frame, . . . . .	\$ .70
" 6 " . . . . .	1.00
" 9 " . . . . .	1.00
Extra Clamp, . . . . .	.10

### PRICE LIST OF HACK SAWS.

Length of blade,	6,	7,	8,	9,	10,	11,	12 inches.
Price per dozen,	.55,	.60,	.65,	.70,	.85,	.95,	\$1.05.



## THE VULCAN HOLLOW HANDLE SCREW DRIVER.

No. 115.

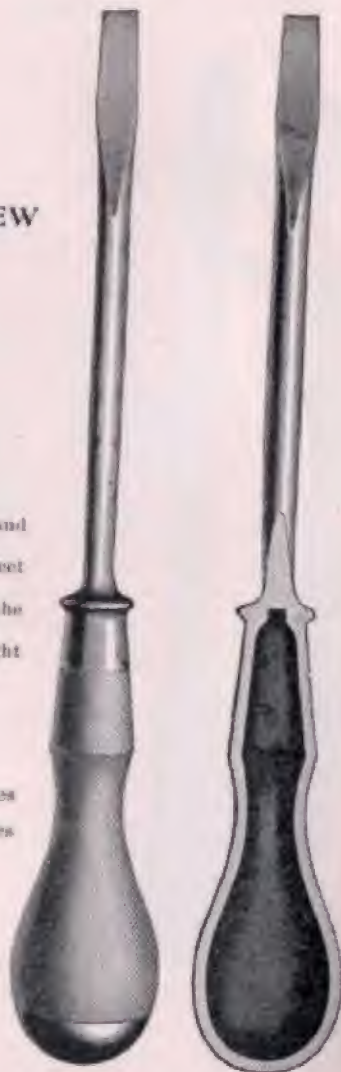
This Screw Driver is light, handsome and powerful. The handles are forged from sheet steel and welded to the blades, making the tool practically one piece. Made with light blades for small work.

Length of Blade,  $2\frac{1}{2}$ ,  $3\frac{1}{4}$ , 4, 5, 6 inches

Whole length,  $5\frac{1}{4}$ ,  $6\frac{1}{4}$ ,  $7\frac{1}{4}$ , 9,  $10\frac{1}{4}$  inches

Price, each .30, .35, .40, .70, .80

" per doz., 3.50 4.00 4.50 8.25 9.50



## • • NOTICE • •

I AM pleased to inform manufacturers, mechanics and the trade, that I have interested myself with Mr. F. J. Gay, of Providence, R. I., in the designing and manufacturing of milling cutters, slitting saws, gear cutters, etc., as represented in the following pages.

Mr. Gay formerly superintended the cutter manufacturing department for the Brown & Sharpe Mfg. Co., but left them to carry out advanced ideas of his own conception by establishing a manufactory based upon improved methods.

To accommodate the increase of my fine tool business, and to make room for moving our cutter plant now at Providence to Athol, I have added to my former plant a building 100 x 40 feet, four stories, with a brick annex 70 x 44 feet. These additions are heavily timbered, thoroughly built, and fitted up with modern improvements. A 110 horse-power wheel and a 100 horse-power engine furnish the additional power. Our machinery is of the most approved kind, some of it designed and built especially for us. Our plant in Providence will be moved here as soon as my buildings, now nearly ready, are completed; meanwhile we are prepared to furnish cutters from the Providence works.

Our cutters are made from a superior quality of steel, and are tempered by a process peculiar to ourselves. The teeth of our formed cutters are shaped to be ground without changing their form, and are warranted A 1.

We are agents for the Dannemora Steel from which our cutters are made, and having annealing facilities that cannot be surpassed, are prepared to supply cut bars annealed in lengths from 6 feet and under for all purposes where a superior quality is needed, and shall be pleased to quote prices and accommodate all in need of it.

For further information see page 73.

Thanking our patrons for past favors, we solicit a continuance of the same.

# L. S. STARRETT, ATHOL, MASS.

## GANES OF MILLING CUTTERS.



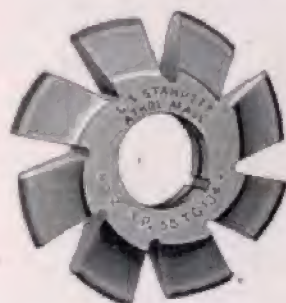
Standard and  
Special Cutters ac-  
curately assembled for  
milling any required outline.



# FINE MECHANICAL TOOLS

## PATENT INVOLUTE CUTTERS.

For Teeth of Gear Wheels.



### NOTICE.

The forms of all my Gear Cutters are originated and made by use of expensive special machinery under careful supervision, therefore are free from all imperfections found in cutters the forms of which are obtained from cutters which are more or less imperfect both on account of alteration in tempering or imperfection of workmanship.

All gears of same pitch cut with these Cutters are interchangeable.  
For instruction in ordering see following page.

Diameter of Pitch.	Price of Each Cutter.	Diameter of Cutter.	Hole in Cutter.	Diameter of Pitch.	Price of Each Cutter.	Diameter of Cutter.	Hole in Cutter.
		in.	in.			in.	in.
*2	\$12 50	5	1 1-4	16	\$2 45	1 15-16	7-8
*2 1-4	11 25	4 1-2	1 1-4	18	2 35	1 15-16	7-8
*2 1-2	10 00	4 1-4	1 1-4	20	2 30	1 7-8	7-8
*2 3-4	9 00	4	1 1-4	22	2 20	1 13-16	7-8
3	7 00	3 15-16	1 1-4	24	2 10	1 3-4	7-8
*3 1-4	6 50	3 11-16	1 1-4	26	1 95	1 3-4	7-8
*3 1-2	6 25	3 1-2	1 1-4	28	1 80	1 3-4	7-8
*3 3-4	6 00	3 3-8	1 1-4	30	1 80	1 3-4	7-8
4	5 50	3 3-8	1 1-4	32	1 80	1 3-4	7-8
*4 1-2	5 00	3 1-4	1 1-4	36	1 80	1 3-4	7-8
5	4 50	3 1-16	1 1-4	*38	1 80	1 3-4	7-8
*5 1-2	4 20	2 7-8	1 1-4	40	1 80	1 3-4	7-8
6	3 90	2 3-4	1 1-16	*44	1 80	1 3-4	7-8
7	3 60	2 9-16	1 1-16	48	1 80	1 3-4	7-8
8	3 40	2 1-2	1 1-16	*50	1 80	1 3-4	7-8
9	3 20	2 3-8	1 1-16	*56	1 80	1 3-4	7-8
10	3 00	2 1-8	7-8	*60	1 80	1 3-4	7-8
11	2 75	2 1-16	7-8	*64	1 80	1 3-4	7-8
12	2 65	2	7-8	*70	1 80	1 3-4	7-8
*13	2 60	2	7-8	*80	1 80	1 3-4	7-8
14	2 55	2	7-8	*120	1 80	1 3-4	7-8
*15	2 50	2	7-8				

Cutters marked \* are made to order.

Gears cut with my Cutters will work with gears cut in accordance with the Brown & Sharpe system, but I would prefer that customers adopt my Cutters exclusively, in order that I may guarantee satisfactory results.



## INVOLUTE GEAR CUTTERS.

Extra Large Diameter.

Diametral Pitch.	Price.	Diameter of Cutter.	Hole in Cutter.
		in.	in.
3	\$8.00	4 3/4	1 1/4
*3 1-4	7 75	4 1-2	1 1-4
*3 1-2	7 25	4 1-2	1 1-4
*3 3-4	6 75	4 1-4	1 1-4
4	6 25	4 1-4	1 1-4
*4 1-2	5 75	4 1-4	1 1-4
5	5 25	4	1 1-4
*5 1-2	5 00	4	1 1-4
6	4 75	3 3/4	1 1-4
*7	4 50	3 3/8	1 1-4
8	4 25	3 1-2	1 1-4
*9	4 00	3 1-2	1 1-4

Cutters marked \* are made to order.

My Gear Cutters can be sharpened without changing their form. According to the system adopted by me any wheel of one pitch will gear into any other wheel or into a rack of the same pitch. *Eight cutters are required for each pitch.* These eight cutters are adapted to cut from a pinion of twelve teeth to a rack, and are numbered respectively as follows:

No. 1 will cut wheels from 135 teeth to a rack.
" 2 " " " " 55 " " 134 teeth.
" 3 " " " " 35 " " 54 "
" 4 " " " " 29 " " 34 "
" 5 " " " " 21 " " 25 "
" 6 " " " " 17 " " 20 "
" 7 " " " " 14 " " 16 "
" 8 " " " " 12 " " 13 "

In ordering, give the *No. of Cutter* and *Diametral Pitch* required. A stock of Cutters, from 3 to 48 pitch, is kept on hand. Cutters in stock can be ordered by telegraph. Form of telegram:—"Send one Cutter No. three, six pitch."

## SPECIAL GEAR CUTTERS.

Worm Wheel Cutters and Cutters of special dimensions are made to order at special prices.

Spur and Bevel Gear Cutters, shown in lists, when ordered with special size hole, are made to order at an advance of fifty cents each on list price. If six or more of one pitch are ordered with special size hole, the list price is charged.

# FINE MECHANICAL TOOLS.

## CUTTERS FOR MITRE AND BEVEL GEARS.

Diametral Pitch.	Price of Each Cutter.	Diameter of Cutter.	Hole in Cutter.
		in.	in.
4	\$5 50	3 3-8	1 1-4
5	4 50	3 1-16	1 1-4
6	3 90	2 3-4	1 1-16
8	3 40	2 1-2	1 1-16
10	3 00	2 1-8	7-8
12	2 65	2	7-8
14	2 55	1 15-16	7-8
16	2 45	1 7-8	7-8
20	2 30	1 3-4	7-8
24	2 10		

These Cutters are carried in stock.

Cutters for pitches not given in the above list will be made to order.

Eight Cutters are made for each pitch as by list of Involute Gear Cutters.

These Cutters are thin enough to cut any bevel gear whose tooth face is not longer than one-third the distance from its outer end to the point where the shaft centre lines meet.

In ordering Cutters for Bevel Gears, if the number of teeth in each gear and the pitch are given, also the angle of the shafts, if different from a right angle, I can select the proper Cutter to send.

When an extra length of face is wanted, requiring an especially thin Cutter, this length should be specified in the order.

## IMPROVED STOCKING CUTTERS.

I am prepared to furnish Improved Stocking Cutters for gears. By the use of these Cutters, the stocking or roughing of gears is greatly facilitated.

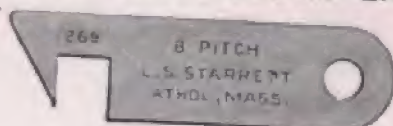
Table showing Depth of Space and Thickness of Tooth in Spur Wheels, when cut with My Cutters.

Pitch of Cutter.	Depth to be Cut in Gear.	Thickness of Tooth at Pitch Line.	Pitch of Cutter.	Depth to be Cut in Gear.	Thickness of Tooth at Pitch Line.
	in.	in.		in.	in.
2	1.078	.785	12	.189	.131
2 1-4	.958	.697	14	.154	.112
2 1-2	.863	.628	16	.135	.098
2 3-4	.784	.570	18	.120	.087
3	.719	.521	20	.108	.079
3 1-2	.666	.448	22	.098	.071
4	.589	.393	24	.090	.065
5	.481	.314	26	.082	.060
6	.389	.262	28	.077	.056
7	.308	.224	30	.072	.052
8	.250	.190	32	.067	.049
9	.200	.155	36	.060	.044
10	.166	.127	40	.054	.039
11	.139	.103	48	.045	.033



# L. S. STARRETT, ATHOL, MASS.

## DEPTH OF GEAR TOOTH GAUGES.



PRICE, . . . . . 25 Cents Each.  
 Made to Order, . . . . . 75 Cents Each.

Depth of Gear Tooth Gauges for all regular pitches, from 3 to 48 pitch inclusive, are carried in stock. One gauge answers for each pitch, and indicates the extreme depth to be cut.



## CUTTERS FOR GROOVING STRAIGHT LIPPED TWIST DRILLS.

No. Cutter.	Price of Cutter.	Diameter of Drill.	Diameter of Cutter.	Hole in Cutter.
1	\$1.50	10.	10.	10.
2	1.70	1-16	1 3-4	7-8
3	1.90	1-8	1 3-4	7-8
4	2.10	3-16	1 3-4	7-8
5	2.30	1-4	1 3-4	7-8
6	2.40	5-16	2	7-8
7	2.60	3-8	2	7-8
8	2.80	7-16	2	7-8
9	3.00	1-2	2	7-8
10	3.20	9-16	2 1-8	7-8
11	3.40	5-8	2 1-8	7-8
12	3.60	11-16	2 1-8	7-8
13	3.80	3-4	2 1-4	7-8
14	4.00	13-16	2 1-4	7-8
15	4.20	7-8	2 1-2	7-8
16	4.50	15-16	2 1-2	7-8
17	5.00	1	2 3-4	7-8
18	5.50	1 1-8	3	7-8
19	6.25	1 1-4	3	7-8
20	7.00	1 1-2	3 1-2	1
21	7.75	1 3-4	3 1-2	1
		2	3 3-4	1

These Cutters can be sharpened by grinding without changing their form. In ordering, give number of Cutter or diameter of Drill, as by above list.

# FINE MECHANICAL TOOLS.



## MILLING CUTTERS.

Cutters not included on list promptly furnished to order, and special attention given to designing gaugs of Cutters for milling straight, irregular or combined surfaces. See page 50.

Listed Cutters of one inch face and over have teeth of a spiral form.

Width of Face.	Price of Each Cutter.	Diameter of Cutter.	Size of Hole.	Width of Face.	Price of Each Cutter.	Diameter of Cutter.	Size of Hole.
in.		in.	in.	in.		in.	in.
1-2	\$1.75	2-1/4	7-8	1-2	\$4.30	3	1-4
1	2.50	2-1/4	7-8	1-3/4	4.50	3	1-4
1-3/4	3.00	2-1/4	7-8	2	4.70	3	1-4
3-16	1.30	2-1/4	7-8	2-1/2	5.20	3	1-4
3-16	1.30	2-1/2	1	3	5.40	3	1-4
1-4	1.40	2-1/2	1	3-1/2	5.90	3	1-4
5-16	1.50	2-1/2	1	4	6.40	3	1-4
3-8	1.60	2-1/2	1	5	7.80	3	1-4
7-16	1.70	2-1/2	1	6	10.80	3	1-4
1-2	1.80	2-1/2	1	1-2	3.15	3-1/2	1-4
9-16	1.90	2-1/2	1	9-16	3.30	3-1/2	1-4
5-8	2.00	2-1/2	1	5-8	3.45	3-1/2	1-4
11-16	2.10	2-1/2	1	11-16	3.65	3-1/2	1-4
3-4	2.20	2-1/2	1	3-4	3.85	3-1/2	1-4
13-16	2.30	2-1/2	1	7-8	4.35	3-1/2	1-4
7-8	2.40	2-1/2	1	1	4.75	3-1/2	1-4
1	2.60	2-1/2	1	1-1/4	5.15	3-1/2	1-4
1-1/4	2.80	2-1/2	1	1-1/2	5.60	3-1/2	1-4
1-1/2	3.10	2-1/2	1	1-3/4	6.00	3-1/2	1-4
1-3/4	3.40	2-1/2	1	2	6.40	3-1/2	1-4
2	3.70	2-1/2	1	2-1/2	6.90	3-1/2	1-4
2-1/2	4.10	2-1/2	1	3	7.40	3-1/2	1-4
3	4.50	2-1/2	1	3-1/2	8.15	3-1/2	1-4
3-1/2	5.00	2-1/2	1	4	9.15	3-1/2	1-4
4	5.50	2-1/2	1	5	10.40	3-1/2	1-4
3-8	1.70	2-5/8	1	6	11.90	3-1/2	1-4
7-16	1.80	2-5/8	1	1-2	3.90	4	1-4
1-2	1.90	2-3/4	1	9-16	4.10	4	1-4
9-16	2.00	2-3/4	1	5-8	4.30	4	1-4
5-8	2.10	2-3/4	1	11-16	4.50	4	1-4
4	6.00	3-1/4	1-4	3-4	4.70	4	1-4
6	10.00	3-1/4	1-4	7-8	5.15	4	1-4
11-16	2.20	3-7/8	1	1	5.65	4	1-4
3-4	2.30	3-7/8	1	1-1/4	6.25	4	1-4
7-8	2.50	3-7/8	1	1-1/2	6.65	4	1-4
5-8	2.10	3	1-4	1-3/4	7.05	4	1-4
7-16	2.25	3	1-4	2	7.45	4	1-4
1-2	2.40	3	1-4	2-1/2	8.40	4	1-4
9-16	2.55	3	1-4	3	9.60	4	1-4
5-8	2.70	3	1-4	3-1/2	10.00	4	1-4
11-16	2.85	3	1-4	4	11.00	4	1-4
3-4	3.00	3	1-4	5	13.50	4	1-4
7-8	3.30	3	1-4	6	15.50	4	1-4
1	3.60	3	1-4	3	9.00	4	1-1/2
1-1/4	4.00	3	1-1/4	6	15.50	4	1-1/2

# L. S. STARRETT, ATHOL, MASS.



## METAL SLITTING SAWS.

These are thin MILLING CUTTERS with the sides accurately ground concave for clearance, and are hardened to cut metals.

In ordering *special* saws, please state for what purpose they are required.

Diameter.	Price.	Thickness.	Hole.
1 in.		in.	in.
2 1-2	\$1 00	1-32	7-8
2 1-2	1 00	3-64	7-8
2 1-2	50	1-16	7-8
2 1-2	50	3-32	7-8
2 1-2	50	1-8	7-8
3	1 25	1-32	1
3	1 10	3-64	1
3	1 00	1-16	1
3	1 00	3-32	1
3	1 00	1-8	1
4	1 45	3-64	1
4	1 25	1-16	1
4	1 20	3-32	1
4	1 20	1-8	1
5	1 80	1-16	1
5	1 60	3-32	1
5	1 50	1-8	1
5	1 50	1-8	1 1-4
6	1 56	1-8	1 1-2
6	2 70	1-8	1
6	3 50	3-16	1 1-2
7	3 80	1-8	1



RIGHT-HAND CUTTER.

## ANGULAR CUTTERS.

I keep in stock Angular Cutters of 40°, 45°, 50°, 60°, 70° and 80° angle, right and left hand, suitable for cutting the teeth of ratchet wheels, cutters and mills.

### PRICES.

Cutters 2 1/2 in. diam., 1/4 in. thick, 1/4 in. hole,	\$2.70 each.
Cutters 2 1/4 in. diam., 1/4 in. thick, 1/4 in. hole,	3.00 "



# FINE MECHANICAL TOOLS.

## CUTTERS FOR SPIRAL MILLS.



RIGHT-HAND CUTTER.

I keep in stock a form of Cutter especially adapted to the cutting of spiral mills, either 53° or 40° one side and 12° on the other. I prefer the 53° angle, except for small and fine-tooth cutters. Right or left-hand cutters are carried in stock.

2½ in. diam., ¼ in. thick, ⅜ in. hole, . . . \$2.70 each.

**Special Shaped Cutters of any Angle made to order.**

## ANGULAR CUTTERS.



RIGHT-HAND CUTTER.

For cutting the teeth of cutters straight or spiral. These Cutters are kept in stock. They can be sharpened without changing their shape by grinding upon the face. Cutters are 2½ in. diam., ¼ in. thick, and have ⅜ in. holes.

PRICE, . . . . . \$3.50 each.

## ANGULAR CUTTERS.

**Which have Side Ground Concave.**



RIGHT-HAND CUTTER.

Owing to the increasing demand for these Cutters, I have decided to carry them in stock. Angles are 40°, 45°, 50°, 60°, 70° and 80°, both right and left hand. Cutters are 2½ in. diam., ¼ in. thick, and have ⅜ in. holes.

PRICE, . . . . . \$2.25 each.

# L. S. STARRETT, ATHOL, MASS.

## END MILLS.



## LEFT HAND MILL.

In ordering state whether Right or Left Hand Mills are wanted.

Diameter of Mill.	Price.	Length of Cut.	Whole Length.	No. of Taper.
in.		in.	in.	
1-4	\$1 00	13-16	2 7-16	4
1-4	1 15	13-16	3	5
5-16	1 00	7-8	2 7-16	4
5-16	1 15	7-8	3 1-16	5
3-8	1 10	7-8	2 7-16	4
3-8	1 20	7-8	3 1-16	5
7-16	1 10	15-16	2 1-2	4
7-16	1 25	15-16	3 1-8	5
1-2	1 20	1	3 1-8	5
1-2	1 45	1 1-8	5 1-8	7
9-16	1 35	1	3 1-8	5
9-16	1 50	1 1-4	5 1-4	7
5-8	1 45	1 1-4	3 5-16	5
5-8	1 70	1 1-2	5 3-8	7
11-16	1 75	1 1-2	6 13-16	9
11-16	1 00	1 1-2	5 1-2	7
3-4	1 80	1 5-8	6 15-16	9
3-4	1 95	1 5-8	5 3-4	7
13-16	1 00	1 5-8	7 1-16	9
13-16	2 00	1 5-8	5 7-8	7
7-8	2 10	1 3-4	7 1-16	9
7-8	2 25	1 3-4	7 1-8	9
10-16	2 10	1 3-4	6	7
15-16	2 25	1 7-8	7 3-16	9
1	2 15	1 7-8	7 3-16	9
1	2 30	1 7-8	6 1-4	7
1 1-16	2 15	1 7-8	7 1-4	9
1 1-16	2 35	1 7-8	7 1-4	9
1 1-8	2 25	2	6 1-4	7
1 1-8	2 40	2	7 1-4	9
1 3-16	2 25	2	6 1-4	7
1 3-16	2 50	2	7 1-4	9
1 1-4	2 25	2	6 1-4	7
1 1-4	2 50	2	7 1-4	9
1 5-16	2 75	2 1-8	7 1-2	9
1 3-8	2 75	2 1-8	7 1-2	9
1 7-16	3 00	2 1-4	7 1-2	9
1 1-2	3 00	2 1-4	7 1-2	9

Special End Mills, Hollow, Counterboring, or any special Mills in this class made to order.

# FINE MECHANICAL TOOLS.



## SPECIAL CUTTERS

FOR

## GROOVING TAPS.

Number of Cutter.	Price of Each Cutter.	Diameter of Taps.		Diameter of Cutter.	Hole in Cutter.
		in.	in.		
1	\$2 00	0 to	1-8	1 3-4	7-8
2	2 10	5-32 to	1-4	1 3-4	7-8
3	2 20	9-32 to	3-8	1 7-8	7-8
4	2 40	7-16 to	5-8	2	7-8
5	2 70	11-16 to	7-8	2 1-8	7-8
6	3 00	15-16 to	1 1-4	2 1-4	7-8
7	3 30	1 5-16 to	1 5-8	2 3-8	7-8
8	3 60	1 11-16 to	2	2 5-8	7-8

These Cutters do not make as deep a groove in proportion to the width as the Tap and Reamer Cutters. They are not suitable for fluting reamers.

These Cutters can be sharpened by grinding without changing their form. In ordering, give number of Cutter or diameter of Tap, as by above list.



## TAP AND REAMER CUTTERS.

These Cutters are adapted for fluting reamers, for which purpose it is only necessary to cut one or more grooves of a less depth in order to produce the flutes unequal distances apart.

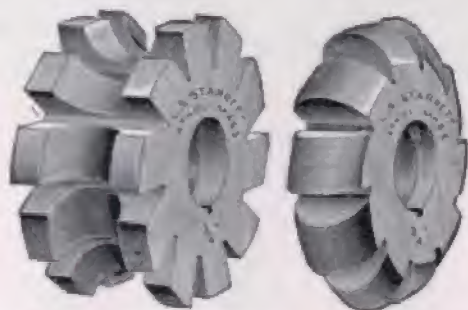
No. of Cutter.	No. of Teeth in Reamer.	No. of Teeth in Tap.	Diameter of Reamer.		Diameter of Tap.		Diameter of Cutter.		Price of each Cutter.
			in.	in.	in.	in.	in.	in.	
1	6	4	1-8 to	1-4	0 to	1-8	1 5-4	7-8	\$2 00
2	6	4	9-32 to	3-8	5-32 to	1-4	1 3-4	7-8	2 10
3	6	4	13-32 to	1-2	9-32 to	3-8	1 7-8	7-8	2 20
4	6 to 8	4	17-32 to	1 1-8	7-16 to	5-8	2	7-8	2 40
5	8 to 10	4	1 5-32 to	1 3-4	11-16 to	7-8	2 1-8	7-8	2 70
6	10	4	1 25-32 to	2	15-16 to	1 1-4	2 1-4	7-8	3 00
7		4			1 5-16 to	1 5-8	2 3-8	7-8	3 30
8		4			1 11-16 to	2	2 5-8	7-8	3 60

These Cutters can be sharpened without changing their form.



# L. S. STARRETT, ATHOL, MASS.

## CONCAVE AND CONVEX CUTTERS FOR MILLING HALF CIRCLES.



These Cutters can be sharpened by grinding without changing their form.

Diameter of Circle.	Diameter of Cutter.	Size of Hole.	Convex Cutter. Price.	Concave Cutter. Price.
in.	in.	in.		
1-8	9	7-8	\$2 00	\$2 40
1-4	2	7-8	2 50	3 60
3-8	2 1-4	7-8	3 10	3 70
1-2	2 1-4	7-8	3 60	4 20
5-8	2 5-4	7-8	4 00	4 80
3-4	2 3-4	7-8	4 40	5 25
7-8	3 1-4	1	4 80	5 75
1	3 1-4	1	5 25	6 30
1 1-8	3 1-2	1	5 75	6 90
1 1-4	3 1-2	1 1-4	6 25	7 50
1 3-8	3 3-4	1 1-4	7 00	8 40
1 1-2	3 3-4	1 1-4	7 75	9 30



## CUTTERS FOR MILLING HAIR CLIPPER PLATES OR SIMILAR WORK.

MADE TO ORDER.

The relative position of teeth are arranged  
similar to cut, or as my customers prefer.

# FINE MECHANICAL TOOLS.



## SCREW-SLOTTING CUTTERS.

These Cutters have a fine pitch of teeth especially adapted for the slotting of screw heads and similar work.

Diameter of Screw Head to be Slotted.	Thickness of Cutter by Amer. Standard Wire Gauge.	Price of Each Cutter.	Thickness of Cutter in Decimals.	Diameter of Cutter.	Size of Hole.
in.	No.	\$	in.	in.	in.
7-8	8	60	.128	2 3-4	3-4 and 1
3-4	9	50	.114	2 3-4	3-4 and 1
5-8	10	40	.102	2 3-4	3-4 and 1
5-8	11	35	.091	2 3-4	3-4 and 1
1-2	12	25	.081	2 3-4	3-4 and 1
1-2	13	20	.072	2 3-4	3-4 and 1
3-8	14	15	.064	2 3-4	3-4 and 1
11-32	15	15	.057	2 3-4	3-4 and 1
5-16	16	15	.051	2 3-4	3-4 and 1
9-32	17	15	.045	2 3-4	3-4 and 1
1-4	18	15	.040	2 3-4	3-4 and 1
7-32	19	15	.035	2 3-4	3-4 and 1
3-16	20	15	.032	2 3-4	3-4 and 1
1-8	21	15	.028	2 3-4	3-4 and 1
1-8	22	15	.025	2 3-4	3-4 and 1
1-8	23	15	.023	2 3-4	3-4 and 1
1-8	24	15	.020	2 3-4	3-4 and 1
1-8	25	15	.018	2 3-4	3-4 and 1
1-8	26	15	.016	2 3-4	3-4 and 1
1-8	27	15	.014	2 3-4	3-4 and 1
1-8	28	15	.012	2 3-4	3-4 and 1
1-8	30	15	.010	2 3-4	3-4 and 1
1-8	32	15	.008	2 3-4	3-4 and 1
1-8	34	15	.006	2 3-4	5-8
3-8	14	20	.004	2 3-4	5-8
11-32	15	15	.003	2 3-4	5-8
5-16	16	15	.001	2 3-4	5-8

(Continued.)

# L. S. STARRETT, ATHOL, MASS.

## SCREW-SLOTTING CUTTERS.—Continued.

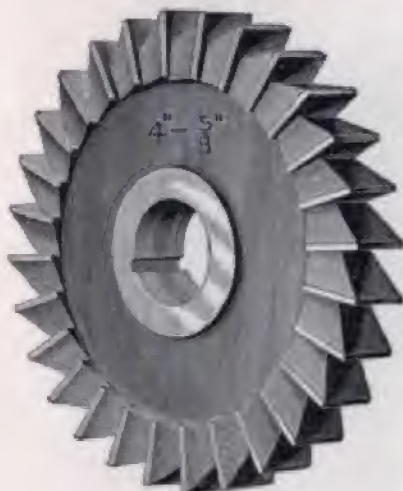
Diameter of Screw Head to be Slotted.	Thickness of Cutter by Amer. Standard Wire Gauge.	Price of Each Cutter.	Thickness of Cutter in Decimals.	Diameter of Cutter.	Size of Hole.
in.	No.		in.	in.	in.
9-32	17	\$9 15			
1-4	18	15	.045	2 3-4	5-8
7-32	19	15	.040	2 3-4	5-8
3-16	20	15	.035	2 3-4	5-8
1-8	21	15	.030	2 3-4	5-8
1-8	22	15	.028	2 3-4	5-8
1-8	23	15	.025	2 3-4	5-8
1-8	24	15	.023	2 3-4	5-8
1-8	25	15	.020	2 3-4	5-8
1-8	26	15	.018	2 3-4	5-8
1-8	27	15	.016	2 3-4	5-8
1-8	28	15	.014	2 3-4	5-8
1-8	30	15	.012	2 3-4	5-8
1-8	32	15	.010	2 3-4	5-8
1-8	34	15	.008	2 3-4	5-8
3-16	20	15	.006	2 3-4	5-8
1-8	21	15	.002	2 3-4	5-8
1-8	22	15	.028	2 3-4	1-2
1-8	23	15	.025	2 3-4	1-2
1-8	24	15	.023	2 3-4	1-2
1-8	25	15	.020	2 3-4	1-2
1-8	26	15	.018	2 3-4	1-2
1-8	27	15	.016	2 3-4	1-2
1-8	28	15	.014	2 3-4	1-2
1-8	30	15	.012	2 3-4	1-2
1-8	32	15	.010	2 3-4	1-2
1-8	34	15	.008	2 3-4	1-2
3-16	20	15	.006	2 3-4	1-2
1-8	21	15	.002	2 1-4	1-2, 5-8, 3-4
1-8	22	15	.028	2 1-4	1-2, 5-8, 3-4
1-8	23	15	.025	2 1-4	1-2, 5-8, 3-4
1-8	24	15	.023	2 1-4	1-2, 5-8, 3-4
1-8	25	15	.020	2 1-4	1-2, 5-8, 3-4
1-8	26	15	.018	2 1-4	1-2, 5-8, 3-4
1-8	27	15	.016	2 1-4	1-2, 5-8, 3-4
1-8	28	15	.014	2 1-4	1-2, 5-8, 3-4
1-8	30	15	.012	2 1-4	1-2, 5-8, 3-4
1-8	32	15	.010	2 1-4	1-2, 5-8, 3-4
1-8	34	15	.008	2 1-4	1-2, 5-8, 3-4
1-8	24	15	.006	2 1-4	1-2, 5-8, 3-4
1-8	25	12	.020	1 3-4	3-8, 1-2, 5-8
1-8	26	12	.018	1 3-4	3-8, 1-2, 5-8
1-8	27	12	.016	1 3-4	3-8, 1-2, 5-8
1-8	28	12	.014	1 3-4	3-8, 1-2, 5-8
1-8	30	12	.012	1 3-4	3-8, 1-2, 5-8
1-8	32	12	.010	1 3-4	3-8, 1-2, 5-8
1-8	34	12	.008	1 3-4	3-8, 1-2, 5-8
			.006	1 3-4	3-8, 1-2, 5-8

Cutters varying from the list are made to order.



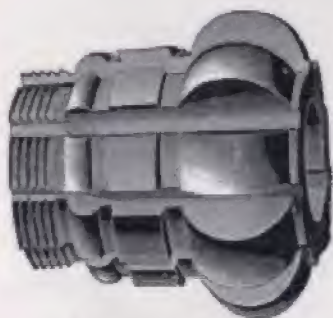
# FINE MECHANICAL TOOLS.

## SIDE MILLING CUTTERS.



Diameter.	Price Each.	Width of Face.	Hole.
in.		in.	in.
2	\$2 00	3-16	1-2
2	2 05	1-4	1-2
2	2 10	3-8	1-2
2	2 00	3-16	5-8
2	2 05	1-4	5-8
2	2 10	3-8	5-8
2	2 15	1-4	7-8
2 1-2	2 20	3-8	7-8
2 1-2	2 25	1-2	7-8
2 3-4	2 30	1-4	7-8
2 3-4	2 30	3-8	7-8
2 3-4	2 35	1-2	7-8
3	2 40	1-4	1
3	2 50	3-8	1
3	2 80	1-2	1
3 1-2	3 50	3-16	1
4	4 70	5-8	1
5	6 00	3-4	1
6	8 50	15-16	1 1-4
6	8 50	15-16	1 1-2
7	17 00	1 1-8	1 1-4
8	23 00	1 3-8	1 1-4
8	25 00	1 3-8	1 1-2

Cutters varying from the above list are made to order.



## FORMED MILLING CUTTERS.

FOR  
Milling Parts of Machinery.

These Cutters can be made in a great variety of outlines, and can be sharpened by grinding without changing their form. They are economical in the production of duplicate and interchangeable parts.

In ordering send sketch of, or sample piece to be milled, with size of hole required, and indicate the direction Cutter is to revolve.

Exact duplicate Cutters can be made at any time. This is of great importance when accuracy in duplication of machine parts is required.

# L. S. STARRETT, ATHOL, MASS.



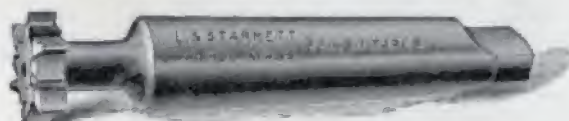
## Best Warranted Annealed Cast Steel. In Bars or Blanks.

To accommodate those wanting a superior quality of steel, annealed or otherwise, we have with our unsurpassed cutting-up and annealing facilities prepared ourselves to supply it. The annealed in blanks, cut to 6 foot lengths and under. The unannealed in bars, or cut to special lengths.

Parties desiring a fine grade of tool steel for any purpose will find it for their interest to confer with us before ordering elsewhere. We shall furnish steel which experience in our own works has proved to be the best, and which, in our judgment, will be best adapted for the purpose wanted. (In ordering, the use for which the steel is wanted should be stated.) Poor steel is dear at *any price*. Steel we furnish, though necessarily costing more than low grades, is the cheapest when made up in tools that will stand to do many times more and better work than a cheaper steel. "Quality tells."

# FINE MECHANICAL TOOLS.

## STANDARD T SLOT CUTTERS.



LEFT-HAND CUTTER.

No. of Cutter.	Price.	Thickness of Cutter.	Diameter of Cutter.	Diameter of Neck of Cutter.	Length of Neck.	No. of Taper.
		in.	in.	in.	in.	
4	\$1 50	5-32	1-2	7-32	1-4	4
7	1 60	5-32	1-2	7-32	1-4	5
10	1 80	5-32	3-8	9-32	5-16	5
13	2 10	5-32	3-8	9-32	5-16	7
16	2 00	7-32	11-16	11-32	3-8	5
19	2 30	7-32	11-16	11-32	3-8	7
22	2 35	7-32	13-16	3-8	7-16	7
25	2 50	7-32	13-16	3-8	7-16	9
28	2 60	9-32	15-16	7-16	1-2	7
31	2 80	9-32	15-16	7-16	1-2	9
34	3 10	13-32	1 3-16	17-32	5-8	9
37	3 45	17-32	1 5-16	21-32	15-16	9

The Cutters are made 1-32 inch larger in diameter than the figures given, to allow for sharpening.

Other sizes and right-hand cutters made to order.

## • • FACTS • •

A desirable milling cutter is made of fine steel, is well designed, well finished, and accurate in all its relative dimensions.

A cutter having 32 teeth making 40 turns per minute will mill a surface at the rate of 1-16 inch to one turn of the cutter, or 2½ inches a minute. If arbor or cutter were inaccurate, it would be necessary to reduce the feed, resulting in a corresponding reduction of products.





# Table of Decimal Equivalents OF Millimeters and Fractions of Millimeters.

$\frac{1}{1000}$  mm. = .0003937 inch.

mm.	inches.	mm.	inches.	mm.	inches.
$\frac{1}{32}$	= .00079	$\frac{29}{32}$	= .02047	2	= .07874
$\frac{3}{32}$	= .00157	$\frac{27}{32}$	= .02126	3	= .11811
$\frac{1}{8}$	= .00236	$\frac{25}{32}$	= .02205	4	= .15748
$\frac{3}{16}$	= .00315	$\frac{23}{32}$	= .02283	5	= .19685
$\frac{1}{4}$	= .00394	$\frac{21}{32}$	= .02362	6	= .23622
$\frac{5}{16}$	= .00472	$\frac{19}{32}$	= .02441	7	= .27559
$\frac{3}{8}$	= .00551	$\frac{17}{32}$	= .02520	8	= .31496
$\frac{1}{2}$	= .00630	$\frac{15}{32}$	= .02598	9	= .35433
$\frac{5}{8}$	= .00709	$\frac{14}{32}$	= .02677	10	= .39370
$\frac{3}{4}$	= .00787	$\frac{13}{32}$	= .02756	11	= .43307
$\frac{7}{8}$	= .00866	$\frac{11}{32}$	= .02835	12	= .47244
$\frac{15}{16}$	= .00945	$\frac{10}{32}$	= .02913	13	= .51181
$\frac{1}{2}$	= .01024	$\frac{9}{32}$	= .02992	14	= .55118
$\frac{13}{16}$	= .01102	$\frac{8}{32}$	= .03071	15	= .59055
$\frac{11}{16}$	= .01181	$\frac{7}{32}$	= .03150	16	= .62992
$\frac{9}{16}$	= .01260	$\frac{6}{32}$	= .03228	17	= .66929
$\frac{7}{16}$	= .01339	$\frac{5}{32}$	= .03307	18	= .70866
$\frac{5}{16}$	= .01417	$\frac{4}{32}$	= .03386	19	= .74803
$\frac{3}{16}$	= .01496	$\frac{3}{32}$	= .03465	20	= .78740
$\frac{1}{8}$	= .01575	$\frac{2}{32}$	= .03543	21	= .82677
$\frac{1}{16}$	= .01654	$\frac{1}{32}$	= .03622	22	= .86614
$\frac{1}{32}$	= .01732	$\frac{1}{64}$	= .03701	23	= .90551
$\frac{1}{64}$	= .01811	$\frac{1}{80}$	= .03780	24	= .94488
$\frac{1}{128}$	= .01890	$\frac{1}{100}$	= .03858	25	= .98425
$\frac{1}{256}$	= .01969	1	= .03937	26	= 1.02362

10 mm. = 1 Centimeter = 0.3937 inches.

10 cm. = 1 Decimeter = 3.937 "

10 dm. = 1 Meter = 39.37 "

25.4 mm. = 1 English Inch.

# FINE MECHANICAL TOOLS

## Table of Decimal Equivalents

OF

8ths, 16ths, 32nds and 64ths of an Inch.

8ths.					
$\frac{1}{8}$ = .125		$\frac{1}{32}$ = .03125		$\frac{1}{64}$ = .015625	
$\frac{2}{8}$ = .250		$\frac{2}{32}$ = .0625		$\frac{2}{64}$ = .03125	
$\frac{3}{8}$ = .375		$\frac{3}{32}$ = .09375		$\frac{3}{64}$ = .046875	
$\frac{4}{8}$ = .500		$\frac{4}{32}$ = .125		$\frac{4}{64}$ = .0625	
$\frac{5}{8}$ = .625		$\frac{5}{32}$ = .15625		$\frac{5}{64}$ = .078125	
$\frac{6}{8}$ = .750		$\frac{6}{32}$ = .1875		$\frac{6}{64}$ = .09375	
$\frac{7}{8}$ = .875		$\frac{7}{32}$ = .21875		$\frac{7}{64}$ = .109375	
16ths.			64ths.		
$\frac{1}{16}$ = .0625		$\frac{1}{16}$ = .0625		$\frac{1}{16}$ = .0625	
$\frac{2}{16}$ = .125		$\frac{2}{16}$ = .125		$\frac{2}{16}$ = .125	
$\frac{3}{16}$ = .1875		$\frac{3}{16}$ = .1875		$\frac{3}{16}$ = .1875	
$\frac{4}{16}$ = .250		$\frac{4}{16}$ = .250		$\frac{4}{16}$ = .250	
$\frac{5}{16}$ = .3125		$\frac{5}{16}$ = .3125		$\frac{5}{16}$ = .3125	
$\frac{6}{16}$ = .375		$\frac{6}{16}$ = .375		$\frac{6}{16}$ = .375	
$\frac{7}{16}$ = .4375		$\frac{7}{16}$ = .4375		$\frac{7}{16}$ = .4375	
$\frac{8}{16}$ = .500		$\frac{8}{16}$ = .500		$\frac{8}{16}$ = .500	
$\frac{9}{16}$ = .5625		$\frac{9}{16}$ = .5625		$\frac{9}{16}$ = .5625	
$\frac{10}{16}$ = .625		$\frac{10}{16}$ = .625		$\frac{10}{16}$ = .625	
$\frac{11}{16}$ = .6875		$\frac{11}{16}$ = .6875		$\frac{11}{16}$ = .6875	
$\frac{12}{16}$ = .750		$\frac{12}{16}$ = .750		$\frac{12}{16}$ = .750	
$\frac{13}{16}$ = .8125		$\frac{13}{16}$ = .8125		$\frac{13}{16}$ = .8125	
$\frac{14}{16}$ = .875		$\frac{14}{16}$ = .875		$\frac{14}{16}$ = .875	
$\frac{15}{16}$ = .9375		$\frac{15}{16}$ = .9375		$\frac{15}{16}$ = .9375	
32nds.					
$\frac{1}{32}$ = .03125		$\frac{1}{32}$ = .03125		$\frac{1}{32}$ = .03125	
$\frac{2}{32}$ = .0625		$\frac{2}{32}$ = .0625		$\frac{2}{32}$ = .0625	
$\frac{3}{32}$ = .09375		$\frac{3}{32}$ = .09375		$\frac{3}{32}$ = .09375	
$\frac{4}{32}$ = .125		$\frac{4}{32}$ = .125		$\frac{4}{32}$ = .125	
$\frac{5}{32}$ = .15625		$\frac{5}{32}$ = .15625		$\frac{5}{32}$ = .15625	
$\frac{6}{32}$ = .1875		$\frac{6}{32}$ = .1875		$\frac{6}{32}$ = .1875	
$\frac{7}{32}$ = .21875		$\frac{7}{32}$ = .21875		$\frac{7}{32}$ = .21875	
$\frac{8}{32}$ = .250		$\frac{8}{32}$ = .250		$\frac{8}{32}$ = .250	
$\frac{9}{32}$ = .28125		$\frac{9}{32}$ = .28125		$\frac{9}{32}$ = .28125	
$\frac{10}{32}$ = .3125		$\frac{10}{32}$ = .3125		$\frac{10}{32}$ = .3125	
$\frac{11}{32}$ = .34375		$\frac{11}{32}$ = .34375		$\frac{11}{32}$ = .34375	
$\frac{12}{32}$ = .375		$\frac{12}{32}$ = .375		$\frac{12}{32}$ = .375	
$\frac{13}{32}$ = .40625		$\frac{13}{32}$ = .40625		$\frac{13}{32}$ = .40625	
$\frac{14}{32}$ = .4375		$\frac{14}{32}$ = .4375		$\frac{14}{32}$ = .4375	
$\frac{15}{32}$ = .46875		$\frac{15}{32}$ = .46875		$\frac{15}{32}$ = .46875	
$\frac{16}{32}$ = .500		$\frac{16}{32}$ = .500		$\frac{16}{32}$ = .500	
$\frac{17}{32}$ = .53125		$\frac{17}{32}$ = .53125		$\frac{17}{32}$ = .53125	
$\frac{18}{32}$ = .5625		$\frac{18}{32}$ = .5625		$\frac{18}{32}$ = .5625	
$\frac{19}{32}$ = .59375		$\frac{19}{32}$ = .59375		$\frac{19}{32}$ = .59375	
$\frac{20}{32}$ = .625		$\frac{20}{32}$ = .625		$\frac{20}{32}$ = .625	
$\frac{21}{32}$ = .65625		$\frac{21}{32}$ = .65625		$\frac{21}{32}$ = .65625	
$\frac{22}{32}$ = .6875		$\frac{22}{32}$ = .6875		$\frac{22}{32}$ = .6875	
$\frac{23}{32}$ = .71875		$\frac{23}{32}$ = .71875		$\frac{23}{32}$ = .71875	
$\frac{24}{32}$ = .750		$\frac{24}{32}$ = .750		$\frac{24}{32}$ = .750	
$\frac{25}{32}$ = .78125		$\frac{25}{32}$ = .78125		$\frac{25}{32}$ = .78125	
$\frac{26}{32}$ = .8125		$\frac{26}{32}$ = .8125		$\frac{26}{32}$ = .8125	
$\frac{27}{32}$ = .84375		$\frac{27}{32}$ = .84375		$\frac{27}{32}$ = .84375	
$\frac{28}{32}$ = .875		$\frac{28}{32}$ = .875		$\frac{28}{32}$ = .875	
$\frac{29}{32}$ = .90625		$\frac{29}{32}$ = .90625		$\frac{29}{32}$ = .90625	
$\frac{30}{32}$ = .9375		$\frac{30}{32}$ = .9375		$\frac{30}{32}$ = .9375	
$\frac{31}{32}$ = .96875		$\frac{31}{32}$ = .96875		$\frac{31}{32}$ = .96875	
$\frac{32}{32}$ = 1.000		$\frac{32}{32}$ = 1.000		$\frac{32}{32}$ = 1.000	

# FINE MECHANICAL TOOLS

## PRINCIPAL STANDARDS

FOR

## WIRE GAUGE USED IN THE UNITED STATES.

Dimensions of Sizes in Decimal Parts of an Inch.

Number of Wire Gauge.	American, or Brown & Sharpe.	Birmingham, or Stubbs.	Washburn & Moen Mfg. Co.	Number of Wire Gauge.
000000	...	...	.46	000000
000000	...	...	.43	000000
00000	.46	.454	.383	00000
0000	.40904	.425	.362	0000
000	.3648	.38	.331	000
00	.32486	.34	.307	00
0	.2863	.3	.283	0
1	.25763	.284	.263	1
2	.23042	.259	.244	2
3	.20431	.238	.225	3
4	.18194	.22	.207	4
5	.16202	.203	.192	5
6	.14428	.18	.177	6
7	.12849	.165	.162	7
8	.11443	.148	.148	8
9	.10189	.134	.135	9
10	.090742	.12	.12	10
11	.080808	.109	.105	11
12	.071961	.095	.092	12
13	.064084	.083	.08	13
14	.057068	.072	.072	14
15	.05082	.065	.063	15
16	.045257	.058	.054	16
17	.040303	.049	.047	17
18	.03580	.042	.041	18
19	.031963	.035	.035	19
20	.028402	.032	.032	20
21	.025347	.028	.028	21
22	.022571	.025	.025	22
23	.0201	.022	.023	23
24	.0179	.02	.02	24
25	.01594	.018	.018	25
26	.014195	.016	.017	26
27	.012641	.014	.016	27
28	.011257	.013	.015	28
29	.010025	.012	.014	29
30	.008828	.01	.0135	30
31	.00795	.009	.013	31
32	.00708	.008	.011	32
33	.006304	.007	.01	33
34	.005614	.005	.0085	34
35	.005	.004	.009	35
36	.004453	...	.0085	36
37	.003965	...	.008	37
38	.003531	...	.0075	38
39	.003144	...	.007	39
40				40





TABLE SHOWING THE SIZES  
OF  
DIFFERENT NUMBERS OF TWIST DRILLS.

No.	Size of Number in Decimals.	No.	Size of Number in Decimals.
1	.2280	31	.1280
2	.2210	32	.1160
3	.2130	33	.1130
4	.2080	34	.1110
5	.2055	35	.1100
6	.2040	36	.1065
7	.2010	37	.1040
8	.1960	38	.1015
9	.1960	39	.0985
10	.1935	40	.0980
11	.1910	41	.0960
12	.1890	42	.0935
13	.1850	43	.0900
14	.1820	44	.0860
15	.1800	45	.0820
16	.1770	46	.0810
17	.1730	47	.0785
18	.1695	48	.0760
19	.1660	49	.0730
20	.1610	50	.0700
21	.1590	51	.0670
22	.1570	52	.0635
23	.1540	53	.0595
24	.1520	54	.0550
25	.1465	55	.0520
26	.1470	56	.0465
27	.1440	57	.0430
28	.1405	58	.0420
29	.1360	59	.0410
30	.1285	60	.0400

# L. S. STARRETT, ATHOL, MASS.

## U. S. STANDARD GAUGES FOR IRON AND STEEL PLATE.

Numbers.	Fractions.	Gauche.	Numbers.	Fractions.	Gauche.
0000000	1-2	320	17	9-160	26
000000	15-32	300	18	1-20	32
00000	7-16	280	19	7-160	28
0000	13-32	260	20	3-80	24
000	3-8	240	21	11-320	22
00	11-32	220	22	1-32	20
0	5-16	200	23	9-320	18
1	9-32	180	24	1-40	16
2	17-64	170	25	7-320	14
3	1-4	160	26	3-160	12
4	15-64	150	27	11-640	11
5	7-32	140	28	1-64	10
6	13-64	130	29	9-640	9
7	3-16	120	30	1-80	8
8	11-64	110	31	7-640	7
9	5-32	100	32	13-1280	6 1-2
10	9-64	90	33	3-320	6
11	1-8	80	34	11-1280	5 1-2
12	7-64	76	35	5-640	5
13	3-32	60	36	9-1280	4 1-2
14	5-64	50	37	17-2560	4 1-4
15	9-128	45	38	1-160	4
16	1-16	40			

# FINE MECHANICAL TOOLS.

## SEPARATE PARTS OF SQUARES, ETC.

Persons ordering extra parts must send in, by mail or otherwise, prepaid, the piece they want stock or blade fitted to. Mark name and address of sender plainly on the package.

### PRICE LIST

#### SQUARE, No. 11.

	Scale.	Stock.	Center Head.
4 inch.	\$ .50	\$ .50	
6 "	.75	.75	\$ .50
9 "	1.00	.75	.75
12 "	1.25	1.00	.75
18 "	1.00	1.00	.75
24 "		1.00	.75
Scrivers,		10 cents each.	

#### SQUARE, No. 8.

	Scale.	Stock.		Scale.	Stock.
18 inch.	\$2.50	\$3.50	24 inch.	\$3.50	\$3.50

#### SET, No. 9.

Prices of Scales, Stocks, and Center Heads, same as for corresponding sizes of No. 11 Square.

Price of Protractor Head, . . . . . \$2.00

#### SQUARE, No. 13.

	Scale.	Stock.	Bevelled Blade.
4 inch.	\$ .50	\$ .75	\$ .40
6 "	.75	1.25	.50
9 "	1.00	2.00	
12 "	1.25	2.75	

#### SQUARE, No. 14.

Stock, . . . . .	\$1.50	Bevelled Blade, . . . . .	\$ .20
Scale, . . . . .	.50	Narrow Blade, . . . . .	.30

#### INCLINOMETER, No. 10.

	Scale.	Stock.	Center Head.
12 inch.	\$1.50	\$3.50	\$ .75
18 "	2.50	3.50	.75
24 "	3.50	3.50	.75

#### LEVEL GLASSES.

Price for Level Glasses for No. 11, 13 and 10, . . . . . 10 cents each.

Price for Level Glasses and setting same, . . . . . 35 cents each.



# S. STARRETT, ATHOL, MASS.

## INDEX

	Page		Page
Bevels, Improvised	12	Leveling Instruments	59
Universal	12	Bevels, Adjustable	57
Calipers, Fay's Patent	35, 37	Iron	56
Firm-Joint	33	Metal Edges, Adjustable	51
Firm-Joint Hermaphrodite	34	Micrometers, Inside	17
Hermaphrodite	33	Speed-1 Screw	16
Lock-Joint	32	Pipe Attachments	14
Lock-Joint Transfer	31	Protractors, Drafts-men's	32
Yankee	38, 40, 41	Improved Bevel	4
Cutnippers		Universal Bevel	13
Cutters, for Grooving Drills		Desk	2
for Milling Clipper Plates	73	Flexible	25
for Mitre and Bevel Gears	67	Key Seat	29
for Spiral Mills	71	Metric	29
Angular	71	Miscellaneous	26
Concave and Convex	74	Narrow	25
Formed Milling	77	Shrink	26
Involute Gear	66	Steel	24
Improved Stocking	67	Saws, Metal Slitting	70
Milling	69	Screw Drivers	62
Patent Involute	65	Section Liners	53
Screw Stocking	75, 76	Separate Parts	85
Side Milling	77	Set, Combination	5
Special Gear	66	Speed Indicators, Improved	54
Special for Grooving Taps	73	High Speed	55
Standard T Slot	79	Squares, Caliper	14
Tap and Reamer	73	Combination	3
Drivers, Bronze	47	Double Steel	5
Extension	46	Draughtsmen's T	5, 53
Fay's Patent	35	Micrometer Caliper	15
Lock-Joint	33	Patent Double	6
Yankee	39	Reliable Try	10, 11
End Mills	72	Special Standard	4
Gauges, Centre	25	Solid Steel	7
Depth	19	Thin Steel	8
Depth of Gear Tooth	68	Steel	7
Inside Caliper	18	Straight Edges	27
Scratch	11	Combination	51
Screw Pitch	39, 21	Surface Gauge Attachments	43
Stair	48	Tables	80-84
Surface	42-45	Trammels, Extension	49
Hand Saws and Frames	60, 61	Improved	50
Inclinometers	9	Transits	58

## POSTAL INSURANCE.

I have made an arrangement with a responsible Insurance Company, by which parcels of merchandise in transit either by registered or unregistered mail to the United States, may be insured against loss upon the payment of the following fees.

In the **unregistered** mail five cents insures parcels valued at \$5.00 or less, and ten cents parcels valued at from \$5.00 to \$10.00.

In the **registered** mail five cents insures parcels valued at \$5.00 or less, and ten cents parcels valued at \$5.00 to \$10.00.

No single parcel **unregistered** will be insured for more than \$10.00, and no single parcel **registered** for more than \$100.00.

Customers wishing parcels insured will please so state in ordering, and add the required fee as given above, to the amount remitted.

If registration is ordered, the regular fee of eight cents should also be added.

## AN ELECTROTYPE

A cut on the inside of this leaf will be furnished free to any hardware dealer who wishes to use it on envelopes, letter heads, in newspapers, or in any other manner of advertising my tools.

Starrett's Tools carried in stock

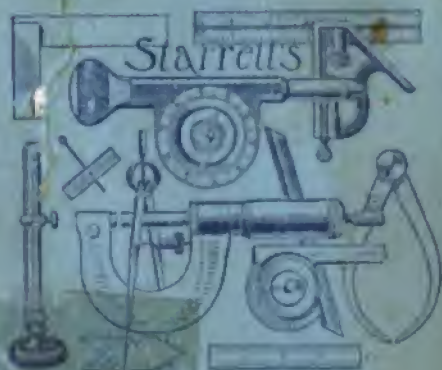
AND WARRANTED

By

Geo. W. Alexander,

....DEALER IN....

Fine Mechanical Tools,



Hardware and Supplies.

401 Market St.,

San Francisco, Cal.